Railway Age

DAILY EDITION

FIRST HALF OF 1919—No. 25a NEW YORK—FRIDAY, JUNE 20, 1919—ATLANTIC CITY SIXTY-FOURTH YEAR

Published weekly by Simmons-Boardman Pub. Co., Woolworth Bldg., New York, N. Y. Subscription Price, U. S. and Mexico, $5.00 a year; Canada, $6.00; foreign countries (excepting daily editions), $8.00. Entered as second-class matter, January 30, 1918, at the post office at New York, N. Y., under the act of March 3, 1879.

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VOLUME 66 JUNE 20, 1919 NUMBER 25a

PUBLISHED EVERY FRIDAY AND DAILY EIGHT TIMES IN JUNE BY THE
SIMMONS-BOARDMAN PUBLISHING COMPANY,
WOOLWORTH BUILDING, NEW YORK.

EDWARD A. SIMMONS, *President.*
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CHICAGO: TRANSPORTATION BLDG. CLEVELAND: CITIZENS' BLDG.
WASHINGTON: HOME LIFE BLDG. CINCINNATI: FIRST NATIONAL BANK BLDG.
LONDON, ENGLAND: 85, FLEET STREET, E. C. 4.
CABLE ADDRESS: URASIGMEC, LONDON.

Entered at the Post Office at New York, N. Y., as mail matter of the second class.

Subscriptions, including 52 regular weekly issues and special daily editions published from time to time in New York, or in places other than New York, payable in advance and postage free; United States and Mexico, $5.00; Canada, $6.00; Foreign Countries (excepting daily editions), $8.00 (£-15s;-0d.); single copies, 15 cents each. Subscription Agents for Great Britain and Egypt: The Dorland Agency, Ltd., 16 Regent Street, London, S. W. 1.

WE GUARANTEE that of this issue, 17,100 copies were printed; that of these 17,100 copies, 15,406 were mailed to regular paid subscribers to the Railway Age and the Railway Mechanical Engineer; 119 were mailed to advertisers, 300 were provided for counter and news compaines' sales, new sbscriptions, bound volumes, copies lost in the mail and office use; and 1,275 copies for distribution at Atlantic City.

THE RAILWAY AGE is a member of the Audit Bureau of Circulations (A. B. C.) and the Associated Business Papers. (A. B. P.)

It is a remarkable fact that even though the Wheel Committee has been reporting for many years, hardly a convention passes without some concrete suggestion for securing increased service from car wheels. In 1917 the re-design of the 675-lb. wheel practically eliminated the cracking of the plate, which had proved so troublesome with the older design. This year the strength of the tread seems to have received special attention, as the committee is considering a change in the location of the limit of wear groove on wrought-steel wheels, and recommends the adoption of a gage to fix the allowable limit of wear for wheels with hollow treads. Undoubtedly a definite condemning limit should be fixed and the gage proposed should meet all requirements. As a measure of protection against arbitrary scrapping, it should prove valuable, and will no doubt be adopted by the association. The suggestion contained in the committee's report that the 625-lb. and 725-lb. wheels may be re-designed is an indication of the excellent service secured from the arch plate design. It has been reported that of forty thousand 700-lb. arch plate wheels in service, only two have been found with cracks in the plates. Probably the most serious trouble experienced with the present standards is the breakage of 625-lb. wheels under refrigerator cars. The high brake shoe pressures and high speeds combine to make the service conditions unusually severe. While it must be admitted that the merits of the 1917 design cannot be definitely determined as yet, the performance which has been secured thus far is very gratifying. In view of the apparent resistance to breakage under temperature stresses exhibited by the arch plate wheel, the next problem to which the committee should give attention is the re-design of the 625-lb. wheel, with special regard for the requirements of refrigerator car service.

The Wheel Committee's Report

It is unfortunate that with the fine attendance at the sessions of the convention this year, probably not half of those in the room are able to follow closely the reading of papers and the discussion following. The acoustic properties of the hall are exceedingly poor, a fact which the large attendance, necessitating the use of the entire floor space, accentuates. It is noticeable that most of the discussion comes from those well toward the front. Is this due to the fact that those deeply interested in the affairs of the section are grouped in a comparatively small section of the hall, or is it because those farther away are unable to follow the course of the proceedings sufficiently closely to take part intelligently? In either case, the result is the same and is detrimental to sustained interest in the meetings. Many of the younger members and attendants receive an unfortunate impression of the value of attendance at the conventions, due to this situation. It would seem to be highly desirable that some experiments be made to determine whether it is not possible and practicable to improve acoustic conditions.

The Acoustic Properties of Convention Hall

On March 1 the aggregate surplus of freight cars in the United States and Canada amounted to 473,080, a greater surplus than has ever before been recorded. During March and April the surplus was reduced and now, little more than three months later, the roads are facing a severe shortage of one class of equipment at least, namely, box cars. The representatives of the car departments of the Western roads who are attending the convention have expressed great concern over the problem of furnishing cars to care for the wheat crop this season. The yield will unquestionably be greater than ever before, and the demand for cars will be augmented by the present circumstances. There is little incentive to hold the grain for an advance in price. Consequently the farmers will attempt to dispose of it as quickly as possible. Furthermore, the elevator capacity is not adequate to take care of the crop, and it will be necessary to market a large percentage of it to prevent deterioration. The abnormal demand for cars comes at a time when the roads are not well prepared to meet it. The percentage of equipment in suitable condition for grain service is unusually low, due in part to the small amount of new equipment purchased in the last two years. Less than one-half of the Administration's order of 100,000 cars has been built to date. About 5,000 box cars are stored at the car builders' plants awaiting disposition, but even if these cars are used they will care for but a very small portion of the crop and it will be necessary for the roads to make every effort to repair the maximum number of cars in time to transport the grain traffic.

The Grain Car Situation

Comparative Draft Gear Data

THE REPORT OF THE COMMITTEE on Draft Gear, which was presented at Thursday's session, calls attention to the drop gear investigations which are being conducted by the Inspection and Test Section of the Railroad Administration. Reference has already been made to these investigations in an article in the May 2, issue of the *Railway Age*, describing these methods of testing the gears under practically service conditions, which have been developed by the Inspection and Test Section and are being applied at the draft gear test plant of the T. H. Symington Company at Rochester, N. Y. The subject of draft gears, is one of importance and one involving many considerations.

The committee brings out clearly in its report limitations of the various methods of testing. It is evident that no one of the methods provides data on which a definite conclusion may be reached as to the relative value of different gears in service. The ideal draft gear, from the standpoint of its characteristics, new, is not necessarily the best gear when considered from the standpoint of the service to be obtained from it over a period of years. The question of life, the change of characteristics during the life and the cost of maintaining the gear in a reasonably perfect condition are factors which are of equal weight with the characteristics of the new gear. It is evident that the only reasonable basis of comparison, considering these factors, involves the accummulation of a large amount of service data which can only be accomplished after the lapse of years of service. The work of the Inspection and Test Section will be of great value in arriving at conclusions on one phase of the subject and it is fortunate that through the co-operation of the committee of the mechanical section, the data will be available to that committee. The committee, however, will still have much work to do in the accumulation of service data involving the question of life and repairs.

The Automatic Train Line Connector

THE MECHANICAL SECTION has taken up the automatic train pipe connector as a subject for consideration. The question was brought up during Thursday's session and referred to the general committee by vote of the members in attendance, with the result that a special committee will probably be appointed to take it up, or it will be referred to one of the standing committees.

The automatic train pipe connector is not a new device. The first connectors were placed in service about eighteen years ago and many different devices have received trials since then. While not all of these have proved successful, the eighteen years' development has demonstrated the desirability of continuing the development so that the manifest disadvantages of the manual couplings may be eliminated. There are several connectors at the present time which seem to be working successfully and the outstanding facts in connection with the service of all of these devices are the increased life of hose and the reduction in train line leakage. The advantages from the standpoint of safety are self-evident.

There seems no insurmountable difficulty in developing devices of this kind to meet the essential mechanical requirements.

The greatest difficulty in the universal use of connectors is the question of interchange. This problem for the connector is practically the same as that which had to be solved in the development of the automatic coupler to the present universal interchangeable standard. To secure the benefits of more than local or isolated installations on special service equipment which is not offered in interchange, all automatic train pipe connectors must operate interchangeably. To expect the immediate or hasty development of a standard type to meet this requirement is unreasonable, as the form of a perfected mechanical device can only be arrived at by first allowing designers the widest latitude in the development of their various ideas. It would be unfortunate, however, if this fact were used as an argument against the widest possible application of the various devices which are now or may be developed, because it is only through such development that the advantages of safety and economy offered by a universally interchangeable automatic connector may ultimately be obtained.

When the investigation of the connector problem has become sufficiently extensive so that well-supported opinions may take form as to the essential requirements of such a device the problem of interchangeability may be considered. Until that time has arrived lack of interchangeability should not be a deterrent on the development of connector devices. In its present stage the question is one of a fair field and may the best man win.

Opportunity of the American Railroad Association

IN their addresses before the mechanical convention yesterday, Mr. Aishton, Mr. Tyler and others touched upon the part the new American Railroad Association can play in bringing about unity of action by the railroads after Government control has ceased, and the Railroad Administration has gone out of existence.

This is a point of the utmost importance. Many of the serious troubles of the railways before Government control was adopted, were due to their failure to work together. In fact, they did not in all things work together as they should have even when the Railroad War Board was in charge of their operation, and this was one of the things which made Government control practically unavoidable.

While, on the whole, Government operation has not been a success, it has brought about some important improvements in operation which could not have been effected without centralized control, and which cannot be perpetuated without some form of centralized control provided by the railroads themselves.

The new American Railroad Association affords the best, and indeed, the only agency in sight, for effecting the co-ordinated working under private control which will be necessary if the best results are to be obtained.

Fortunately, the difficulties in the way of co-operation between the railroads regarding operation will be much less formidable in the future than they have been in the past, since it appears certain that the Sherman anti-trust law and the anti-pooling law, as they apply to railways, will be repealed at the present session of Congress. These laws in the past rendered it very difficult for the railways to adopt and enforce among themselves the measures necessary to secure the co-operation and co-ordination of operation which all recognized as desirable.

The new American Railroad Association is fortunate that it is going to begin its career with R. H. Aishton as its president. No railway manager in the country unites in himself better than Mr. Aishton does the qualities of energy, courage, tact, thorough knowledge of the "railroad game," which are needed in order to give the association a good start in the right direction. Upon the way the new American Railroad Association performs its enlarged functions will largely depend the future of the railways of the United States.

Program For To-day

9.30 A. M. TO 1.30 P. M.

Discussion of Reports on:	
Safety Appliances	9.30 A. M. to 9.45 A. M.
Loading Rules	9.45 A. M. to 10.15 A. M.
Car Construction	10.15 A. M. to 10.45 A. M.
Car Trucks	10.45 A. M. to 11.30 A. M.
Train Lighting and Equipment	11.30 A. M. to 12.00 M.
Tank Cars	12.00 M. to 12.30 P. M.
Questions Proposed by Members	12.30 P. M. to 1.30 P. M.

ENTERTAINMENT

10.30 A. M.—Orchestral Concert at Entrance Hall, Million Dollar Pier. Fry Philharmonic Orchestra.

3.30 P. M.—Band Concert and Impromptu Dancing, Entrance Hall, Million Dollar Pier. Royal Scotch Highlanders' Band. Tea will be served at 4.30 P. M. in Entrance Hall.

9.30 P. M.—Grand Ball, Ball Room, Million Dollar Pier. Royal Scotch Highlanders' Band.

Badges Must Be Worn!

THE DOOR COMMITTEE of the Entertainment Committee again wishes to emphasize the importance of the wearing of badges at all times. The Door Committee is an important unit; it has difficult problems to solve and rather hard situations to adjust. It should be given real, not half-hearted, help.

Daily Distribution

FOR MANY YEARS it has been the policy to put the *Daily Railway Age* in the hands of those attending the convention as early as possible. In most of the hotels the *Daily* will be found on a table at the entrance to the dining rooms, while at others they will be found on the hotel registration desk.

Big Guns in Action

IN CONNECTION with the program to be given on the pier on Sunday evening, at 8.15, there will be shown a series of motion pictures illustrating large naval guns in action in France. These pictures will be exhibited by the United States Navy and a naval officer will be present to explain them.

Carnival Night

It was carnival night at the Million Dollar Pier last night. The three thousand convention people who attended the entertainment voted unanimously that it was "some big night to-night" and it was.

Those who went were fortunate and by the same token those who failed to attend now regret it.

The fun commenced in the ball room at about 9 o'clock when the Royal Scotch Highlanders started a program of sixteen dances. During the dances members of the Entertainment Committee distributed vari-colored paper hats and caps, confetti, ticklers and so forth.

The management of the evening's entertainment was in the hands of the following: W. K. Krepps, general chairman; R. J. Himmelright, chairman; Ellsworth Haring, L. O. Cameron, H. E. Passmore, G. A. Nicol, R. H. Gwaltney and J. E. C. Holding.

Air Brake Meeting

The Executive Committees of the Air Brake Association and the Air Brake Appliance Association will hold a joint meeting at 10 o'clock Friday morning at the Marlborough-Blenheim.

Chairman Chambers Appoints Committees

CHAIRMAN CHAMBERS has appointed the following Committee on Subjects for the American Railway Association, Section III, Mechanical; M. K. Barnum, C. E. Fuller, D. R. MacBain, T. H. Goodnow and J. C. Fritts.

Messrs. W. E. Dunham, B. P. Flory and R. L. Kleine have been appointed on the Committee on Resolutions and Correspondence.

Committee on Obituaries

CHAIRMAN CHAMBERS named the following Committee on Obituaries at the Wednesday afternoon session: On J. L. Greatsinger, F. W. Brazier; on Henry Hardie, C. F. Giles; on C. D. Porter, A. W. Gibbs; on R. E. Smith, Willard Kells; on C. W. VanBuren, W. H. Winterrowd; on R. A. Billingham, F. W. Gaines; on D. M. Perrine, J. T. Wallis; on Dr. Angus Sinclair, C. E. Chambers; and on J. W. Heintzelman, Geo. McCormick.

Lost and Found

FOUND—Badge No. 2290. Call at the office of the *Daily Railway Age*.

LOST—By Miss E. D. Knapp, Iroquois, Hotel, Atlantic City, R. S. M. A. badge; also bar pin and silk handkerchief (colored).

LOST—Dark brown sable scarf during the informal dance Wednesday evening. It was left on one of the chairs immediately in front of the Galena Signal Oil Company exhibit. Please return to Mrs. C. F. Massey, care *Railway Age* office, at the entrance of the pier.

Railway Club Secretaries

THE SOCIETY of Railway Club Secretaries held a brief meeting yesterday morning, Mr. A. J. Merrill, of Atlanta, chairman, presiding, and adjourned to meet again at 10 o'clock this morning in room 192 of the Blenheim.

Later, with several invited guests, the members had a "round table" luncheon at the Blenheim. This is an innovation in the society's work. It proved of so much pleasure and profit to all concerned that it will be a permanent feature of the annual meetings.

The Man Who Saw

The "old timer's" emotion was only exceeded by his admiration as he surveyed the latest greyhound of the rails, the monster Mallet locomotive in the exhibit of the Pennsylvania Railroad, near the Atlantic City station. The Man, observing his interest, came nearer and ventured to ask him what he thought of it.

"It is wonderful, sonny," said Andrew Chambers. "I have watched them grow for 50 years. In 1868 I started running for the Pennsylvania Railroad, and held the job without an accident for 44 years. Since 1873 I have had the honor of pulling seven different presidents of the Pennsylvania Railroad and three Presidents of the United States. I have never missed a mechanical convention, and this is the finest one I ever saw. I handled one engine—the 937—from 1873 to 1912. Yes, it is wonderful. I am through now; let the younger boys have a chance."

Running Orders for the Boss

"What I would like to know is, who's supposed to be running this job here, anyway?"

The irate, sputtering master car builder bounced out of his office and bumped into The Man who waited patiently outside for an "interview" and nearly knocked him down.

"Last night I told the worst stenographer I ever saw that she wouldn't do, and I was sorry to be compelled to seek another in her place.

"Why, she even leaves the "i" out of railroad. Deprive her of her trusty eraser and she would cease to function altogether!

"Now comes an important person who calls herself the Secretary of the Amalgamated Association of Secretaries to inform me that she has reviewed the case and finds that Miss Smith has done nothing whatever to merit dismissal.

"She furthermore stated that she has decided to recommend that Miss Smith remain on the job. If Miss Smith goes, she says the whole works goes."

Now, what do you think of that?

U. S. Presidents and Machine Tools

"Do you realize," said a mechanical engineer, "the quality of some of the talent employed on this floor?"

The "talent" referred to, scattered here and there among the exhibits in the machine tool section, was surrounded by interested groups from 48 States, watching this year's innovations in drilling, boring, planing, grinding and other operations. The turning of wheels everywhere evidenced the machine tool builders' ingenious perfection of devices that meant "more miles for less money."

"Do you see that fellow with the gray suit and glasses?"

"Yes," said The Man. "Who is he?"

"Well, he is the publicity manager for the tool concern in whose booth he is standing. A few years ago, right on this same pier, this unassuming fellow, who was the personal press representative for a presidential candidate, closed a campaign that helped to elect a President of the United States. The man standing on his right is the 'daddy' of motion on the pier. He was the first man to exhibit a tool doing business at the convention, and he put up a sign which read, 'Look what's coming off here!' That was 13 years ago—to-day they are all moving."

"That is talent," said The Man, in appreciation of the press agent; and "that was initiative," said the mechanical engineer, as a tribute to the pioneer exhibitor of operating tools.

The Shipper Speaks

The Shipper and the Labor Delegate had casually noted each other's presence in the lobby and The Man had been watching them both. Feeling that each other had something to "get off of his chest," The Man timidly approached the Delegate to get some "views."

"Wages won't come down; if they change, they'll go up. Attempts at 'slave driving' will be promptly squelched."

The Shipper, anxious to hear any discussion participated in by the well-known Delegate, moved nearer to the conversation. For the benefit of the Shipper, the Delegate repeated his threat, whose intended effect brought this immediate response:

"Gentlemen, pardon me. I could not help overhearing your conversation. Evidently you men represent the interests of the workman. I am a shipper of a thousand tons of merchandise a month. I acknowledge our obligation to the men whom you represent. As proof of my sincerity you are invited to visit my plant. Come and talk to my men. You will find that our workmen have all they demand—and a little more. But I want to tell you that the forty-five men who are soldiering on the thirty-man job at the P. & X. shops right in this town, have something to do with the rate that I pay to send my stuff to you.

"You both use my product. You are paying more for my goods than you would pay if you were more concerned over an honest analysis of the condition that I mentioned, than in the indulgence of defiant generalities. Think it over!"

The Man looked at the Delegate as the Shipper withdrew. "Well, what do you say?" said The Man. "To hell with him," said the Delegate.

The Crepe Hanger

"Oh, I've tried that darn thing—put it on three locomotives—we didn't get anywhere with it."

In hanging this little bit of crepe on the door of the supplyman, the visitor complimented his own alleged abilities in his remark. He seemed to have stamped himself as a duly qualified member of an ever-present minority of weak sisters who usually only half-heartedly encourage the development of new devices to which the transportation world to-day owes its very existence.

"I wonder," thought The Man, eyeing the retreating crepe hanger with suspicion, "if that fellow *really* tried it to get the results. I wonder if he thought of the supplyman's contribution of confidence, courage and money in the gradual perfection of the device which was already commencing to exceed its promises on other lines?"

The Man's thoughts took him back to the early days of the superheater and brick arch. He remembered the army of "conscientious" objectors, the coldness of whose feet was only exceeded by the chilliness of their reception of those who persisted day and night in their efforts to save coal and increase the train load. And hope for the ultimate salvation of the crepe hanger lies in the supplyman's refusal to attend the funeral.

A. R. A. Executive Committee at the Convention

R. H. Aishton Elected President of the Big Organization and W. T. Tyler, First Vice-President

THE FIRST MEETING of the Executive Committee of the reorganized American Railroad Association, which was held in Atlantic City yesterday, proved to be one of the most interesting and important events that have ever been associated with the mechanical conventions. All the members of the Executive Committee were present except Charles A. Prouty, director of the Division of Accounting of the Railroad Administration; E. E. Calvin, federal manager of the Union Pacific, and H. G. Kelley, president of the Grand Trunk Railway. The most important work done at the meeting was the election of officers, which resulted as follows:

President, R. H. Aishton, regional director, North Western Region.

First vice-president, W. T. Tyler, director of the Division of Operation, United States Railroad Administration.

Second vice-president, E. H. Coapman, federal manager of the Southern Railroad.

General secretary and treasurer, J. E. Fairbanks, who was re-elected.

Assistant general secretary and assistant treasurer, H. J. Foster.

It was decided to hold the first annual meeting of the reorganized association in Chicago, on the third Wednesday in January. C. W. Crawford was elected chairman of the General Committee on Transportation, which will constitute Section 5.

After the meeting of the committee adjourned all of its members proceeded in a body to the Million Dollar Pier, where the Mechanical Section of the association was in session. C. E. Chambers, president of the Mechanical Section of the association, who was presiding, invited the visitors to the platform and introduced the new president of the association, Mr. Aishton, who delivered a short address, which was received with much enthusiasm. In the course of his remarks, Mr. Aishton said:

Mr. Aishton's Remarks

"I was just elected president of the American Railroad Association. I do not know why, or did not know until I got on this magnificent pier, and some fellow told me they elected me president so that I could make a speech for them at your convention. That is not much of a reason why a man should be elected as president of such an important institution as the American Railroad Association, and, furthermore, I could hardly qualify on those grounds, because I am not a very great success as a speech maker.

"I have been connected with the American Railway Association—now the American Railroad Association—for a great many years, and I have been on the Executive Committee for a long while, and I want to tell you gentlemen that a visit to your convention here has certainly broadened us out, because I know all the history of the American Railroad Association, and we never had a meeting in a Greek temple on the Million Dollar Pier, and at no place where we went did we ever get a badge that entitled us to the many things that this badge of your association entitles us to. (Laughter and applause.)

"It goes without saying that the Executive Committee is glad to be with you. Government control of railroads, as you know, is almost universally condemned by the public, but if the public could be here with us today, and could see what a magnificent meeting you folks are having, I think they would say that government control, at least, has given you the largest and I think one of the most enthusiastic meetings you have ever had in your associations. (Applause.) You also have here a wonderful exhibit of railway equipment and devices for which the manufacturers deserve unstinted credit and praise.

"We have been going through strenuous times. We have been through the greatest war in history. It is true that we only went in in 1917, but previous to that, for two or three years, we had given all the assistance we could to the Allies in an indirect way through our transportation machine, and I think it is the general verdict of everybody in Washington, at least of the real people in the United States, that if there was one class of men in the United States who met successfully the burden that was put upon them, it was the railroad men.

"We are going through strange times, times when all our past precedents and ways of doing things are in the discard. No man can tell what the future has in store for us or where we are going. The President of the United States has announced very definitely that the roads are going back to their owners on January 1st next. I do not think there is a dissenting voice on that proposition, either from Congress, the people of the United States, from the Administration or from the railroad men.

"But we are going to be up against one of the greatest constructive periods we have ever gone through. I am one of those who do not believe that in the future the selfish conditions which have prevailed in the past are going to prevail in the railroad business or any other business of this country in future. I believe the time has come when all men must work together, and I firmly believe that the welding together of all these railroad interests, the welding together of your Master Car Builders' Association, and your American Railway Master Mechanics' Association, and all these various associations, into one big force, is going to be to the advantage of all of us.

"What has held the railroads together during the last 18 months? It has been the Railroad Administration—it has been the central authority that said what ought to be done, and how to do it, that has held us together. We have made mistakes in the Railroad Administration, lots of them—who has not?—they made mistakes in all the Allied countries—they are free to admit that they made many mistakes in the conduct of the war—but, on the whole, if it had not been for the centralized control of the Railroad Administration, I doubt if we could have gotten through the job as well as we did. In fact, I know we could not have done so.

"What is going to happen? The Administration is going to let go control the first of January, and we will be placed upon our own resources—that is what they say, and most of us hope that it is true.

"In my opinion, the action you people have taken in joining hands in one great big functioning machine is what is going to hold us together, and the people will look to your organization to co-ordinate this whole railroad system into one great big system, in so far as methods of doing things are concerned, and I firmly be-

lieve that the day has come when individual idiosyncrasies, and all that kind of thing, which in the end cost considerable money when applied to railroads, and which in the end the public has got to pay for, will disappear, and I believe that the American Railroad Association, with you gentlemen as the directing force of that Association, putting it up to the Association to make effective your recommendations regarding the things that you as a collective body believe to be right, is going to be the main thing that is going to tie this railroad system together, and make a smooth working machine of it, when the central direction, as represented in the Railroad Administration lets go.

"Now, for the members of the Executive Committee—they are all very modest, and I am afraid they will not speak for themselves, and they want me to speak for them. All I have to say is that the Executive Committee of the American Railroad Association will stand with you on any reasonable proposition. If you have something bothering you, and you want to have it straightened out, call on us and we will send some one down here to take it up with you, or I will come myself, if I can, as I spend most of my time traveling about the country, and, if possible, I would be glad to come.

"You are here to work out the practical problems connected with the operation of the railroads. Who knows the mechanical end of the railroads, if you gentlemen do not? I have been a railroad president for three or four years and all of these gentlemen on the platform are railroad presidents, and pass as 'wise guys,' but when it comes down to finding out something you know who they go to.

"I want you to know that we are all traveling together, and that we must work out this problem together. There is no one man who is going to do it, but it is the hundreds and thousands of men who are thinking about these things that are being brought up in your Association, and who finally crystallize them into something definite that finally produce something that is of inestimable value, in the line of progress, who are going to bring about the results which are so much to be desired.

"I would like to state to your entire convention that, from the sample I have seen so far of it, it is very fine. I have had two free rides in a rolling chair on the Boardwalk because I have this badge, something that never happened to me before in Atlantic City (laughter), and all I can say, in conclusion, is that if there is anything that the Executive Committee of the American Railroad Association can do to assist you, call upon us and we will be glad to help you." (Applause.)

Remarks of Mr. Tyler

The chairman then introduced W. T. Tyler, who in turn presented to the convention J. E. Fairbanks, general secretary of the American Railroad Association; Mr. Bush, Regional Director of the Southwestern Region; Mr. Powell, Director of the Division of Capital Expenditures; Mr. Jackson, Federal Manager of the Chicago & Eastern Illinois, and G. L. Peck, Federal Manager of the Pennsylvania Lines West of Pittsburgh.

Mr. Tyler said in part:

"I cannot add anything to what Mr. Aishton has said, except to say if these two rides which he has had are the first two free rides he has ever had, he has one still coming to him. (Laughter.)

"I do want to say that I think while the work of the Railroad Administration and the work of the railroads under the Administration has been most remarkable in a great many ways, one of the most remarkable results has been in the matter of organization. When the railroads were taken over in January, 1918, the Railroad Administration was entirely without any landmarks, without any precedents, without any light at all on the matter of procedure. The Director General had to reach out largely in the dark, and gather together an organization. I presume that he had advice on the subject, although most of the additions that were made to the organization after I became connected with it, which was in the second week of its life, seemed to be almost entirely without suggestion. The Director General might call his staff together, but, as a rule, either he or some member of his staff recommended a man and it went through.

"There was gathered together at Washington an organization that worked in absolute and complete harmony, and is doing so up to this time. There has never been, so far as I know, a discordant note in that central organization. I think that thing itself is most remarkable. Now, that condition prevailed naturally, you might say, during the period of the war as the result of the patriotism of the members, but it continued after the signing of the armistice in just exactly the same degree as it did before, and it continues and goes along, even when the minds of the individual members very naturally are largely turning to the return of the railroads.

"That organization, as I have said, is functioning today perfectly, and in this meeting here we see the same signs of perfect success in working out a complete organization of the railroads of the United States, to take the place of the U. S. Railroad Administration when it shall cease to exist by act of the President. So that I think, not only from what the railroads did toward winning the war—and when I say the railroads I mean, of course, railroad men—but from what is now being done by the rank and file of these various organizations to promote an organization that will go on and keep up what has already been accomplished, we are going to get results that could not have been accomplished in any other way, and results well worthy of all that we have all done in the past eighteen months, for first, the Government, and second, the railroads.

"I am hopeful that before the roads are finally turned back there will be, as Mr. Aishton has said, a complete organization of all the functions of the operation of these railroads in one smooth, working body."

Mr. Markham Speaks

In introducing C. H. Markham, the Chairman, Mr. Chambers, said: "While there were no doubt many difficulties attending the work under the Railroad Administration, I presume almost everyone found some pleasure in the work—I know that was true in my case—for if it had not been for the creation of the U. S. Railroad Administration, I might have lived my lifetime and never been associated with one man, to know whom it has been a great pleasure to me, and I will ask Mr. Markham, Regional Director of the Allegheny Region, to say something."

"I am very glad," said Mr. Markham, "to have had the opportunity of appearing before the organization that in its work is doing as much for the railroads of the country as any that I know of. I am particularly glad of the opportunity that is given me to testify to my own appreciation of having had the privilege of being associated in the work of the Regional organization of the Allegheny Region, with your esteemed Chairman, Mr. Chambers. To be associated with Mr. Chambers is not only a privilege but a great pleasure."

Remarks by Mr. Powell

Mr Powell, when called upon, said: "I am in a most unfortunate position, because while I have the title of Director of the Division of Capital Expenditures, my

constant effort is to keep down expenditures. We had hoped that Congress would be willing and liberal enough to give us the money that we required for the operation of the railroads, but they became cautious and cut down the appropriation bills, including the Army and Navy appropriation bills, and when they came to the appropriation for the Railroad Administration, they landed on us with both feet, and cut off a greater proportion of our appropriation than in any other bill, and because of this you will see that I really have not much to say."

Regional Director Winchell Introduced

Mr. Winchell, the southern regional director, said in part:

"I want to comment a little upon what Mr. Tyler said about the Director General reaching out in the dark, and not knowing what he was doing. That is not quite so in my case, because he did not send for me until he knew what he wanted, and that was the first of June. (Laughter.) This thing of being a Regional Director may be more or less hard for you to understand, because it was hard for us to understand. I think it was Samuel Butler, who said a great many years ago, that life is a good deal like playing a violin solo in public without knowing anything about the violin, but learning the instrument as you went along. That is very much like what the position of being Regional Director has been, but it has been the most interesting work that I have ever done in my life, and I am sure it has been so to a great many others.

"We have had broad opportunities, doubtless many opportunities we have not risen to, but anything we did accomplish could not have been done without the splendid support that has been given us by everybody, and no support has been more valuable than that which came from the members of your organization. Before I sit down I want to testify to the accuracy of the remarks which were being made by a very talented speaker as we came into the room, on the subject of cleaning air brakes. I want to tell you there is no discriminatory practice in that matter, for I started out from Atlanta not long ago with bright new lettering, stating the date I had beencleaned up, the day before, and I got to Louisville with the brake acting badly, and found it was dry and full of sand." (Laughter.)

Regional Director Maher Speaks

Mr. Maher, regional director of the Pocahontas Region, said:

"I am reminded at this meeting that when I was on a railroad once I heard a man say that an engine was the only thing that earned money on a railroad. This section of the American Railroad Association I regard as a vital section. I think your work is probably as important, if not more important, than that of the other sections; unless we have the locomotives and cars in good shape, the railroad cannot be operated. I am very much in sympathy with the statement of Mr. Aishton and Mr. Tyler that the amalgamation of this association with the American Railroad Association is going to be one of the greatest helps to the whole railroad situation that we have in this country."

Mr. Stone, Federal Manager of the Erie; Mr. Gorman, Federal Manager of the Rock Island, and others also spoke briefly. Mr. Gorman paid a high compliment to Mr. Tollerton, mechanical superintendent of his lines.

The members of the Executive Committee of the American Railroad Association constitutes the largest body of the higher operating officials of the railways who have ever attended the mechanical conventions in one group. They had been expected at the convention hall some time before they arrived, and the hall was crowded and many persons were standing. In proceeding to the hall, the distinguished visitors passed through parts of the pier containing a large part of the exhibits. Most of them had never seen a mechanical exhibit at Atlantic City before, and they expressed great astonishment and satisfaction because of its magnitude and completeness.

A few of the executives left for their homes yesterday, but most of them remained over for the purpose of taking advantage of the opportunity of making a more thorough inspection of the exhibit.

Some Facts About the Members of the Committee

Some details regarding the personnel of the Executive Committee of the American Railroad Association may be of interest.

Mr. Aishton, the new president of the association, is regional director of the North Western Region, and was formerly president of the Chicago & Northwestern Railroad. When the Railroad Administration was originally organized, all the railroads west of the Mississippi River were comprised in the Western Region, of which Mr. Aishton was director. Some years ago he was first vice-president of the American Railway Association, and was in line to be elected president but declined the office because at that time W. A. Gardner, then president of the North Western, was in bad health, and Mr. Aishton, who was then vice-president of the road, felt that his railroad required his undivided attention. He is one of the biggest, ablest and most public spirited railroad men in the United States, and withal a man with a personality so attractive that he is one of the most popular railroad men in the country.

William T. Tyler, the director of operations of the Railroad Administration, and the new first vice-president of the American Railroad Association, is a thoroughly experienced railroad operating man, who has served on various railroads, including the Great Northern, the St. Louis & Iron Mountain, the St. Louis-San Francisco, the St. Louis-Southwestern and the Northern Pacific. He was general manager of the Frisco, vice-president of the Cotton Belt, and assistant to the vice-president of the Northern Pacific. He was occupying the last-named position when the Railroad Administration was organized and C. R. Gray was appointed director of operation. Mr. Gray immediately wired, asking Mr. Tyler, who had served under him on the Frisco, to become his senior assistant. Mr. Tyler served as senior assistant director of the Division of Operations until Mr. Gray retired, late in 1918, when Mr. Tyler was appointed to succeed him. No railroad man in the country has worked harder than Mr. Tyler during the last year and a half. The strain imposed by the long hours he has had to keep in his office in Washington has been tremendous, but his rugged constitution has enabled him to stand up under it. Personally, Mr. Tyler is one of the most congenial and approachable of men, and all of his friends know that promotion to his present position as the head of the operating department of the railroads of the United States, while it has made him busier, has made him no less democratic and approachable than he always has been.

T. C. Powell, director of the Division of Capital Expenditures, was connected with the Southern Railway System for many years, having become vice-president of this road in 1905. Mr. Powell did much important work for the Government in important positions in Washington during the war. He succeeded Judge R. S. Lovett as head of the Division of Capital Expenditures, when Judge Lovett retired after the signing of the armistice.

A. T. Hardin, regional director of the Eastern Region, was formerly vice-president in charge of operation of the New York Central. He was made assistant regional director of the Eastern Region and succeeded A. H. Smith as regional director when the latter retired a short time ago.

C. H. Markham was president of the Illinois Central when Government control of railroads was adopted. He was first appointed regional director of the Southern Region, and later was appointed regional director of the Allegheny Region when the latter region was created.

N. D. Maher, regional director of the Pocahontas Region, was president of the Norfolk & Western when Government control was adopted and served as federal manager of that road until the Pocahontas Region was created.

B. F. Brush, regional director of the Southwestern Region, was president of the Missouri Pacific before Government coltrol was adopted and later was federal manager of that road.

Hale Holden, regional director of the Central Western Region, was formerly president of the Chicago, Burlington & Quincy. He was chairman of the Railroad Presidents' Conference which, in 1916, carried on the negotiations with President Wilson in the eight-hour controversy with the train service employees. He was a member of the Railroads' War Board, which supervised the operation of the railroads for the railway companies in 1917.

B. L. Winchell, regional director of the Southern Region, was formerly president of the Rock Island, and later the Frisco. He was traffic director of the Union Pacific when he was appointed regional director of the South.

W. J. Jackson, federal manager of the Chicago & Eastern Illinois, was formerly president and later receiver of that road. He was long chairman of the Committee on Relations of Railway Operation to Legislation.

E. H. Coapman, federal manager of the Southern, was vice-president in charge of operation of that road when Government control was adopted.

H. E. Byram, federal manager of the Chicago, Milwaukee & St. Paul, was federal manager of that road, and J. M. Hannaford, federal manager of the Northern Pacific, was president of that road, before they were appointed federal managers. G. L. Peck, federal manager of the Pennsylvania Lines West, was vice-president in charge of operation of those properties. J. E. Gorman was president of the Rock Island Lines before he was appointed their federal manager. A. J. Stone, federal manager of the Erie, was vice-president in charge of operation of that road.

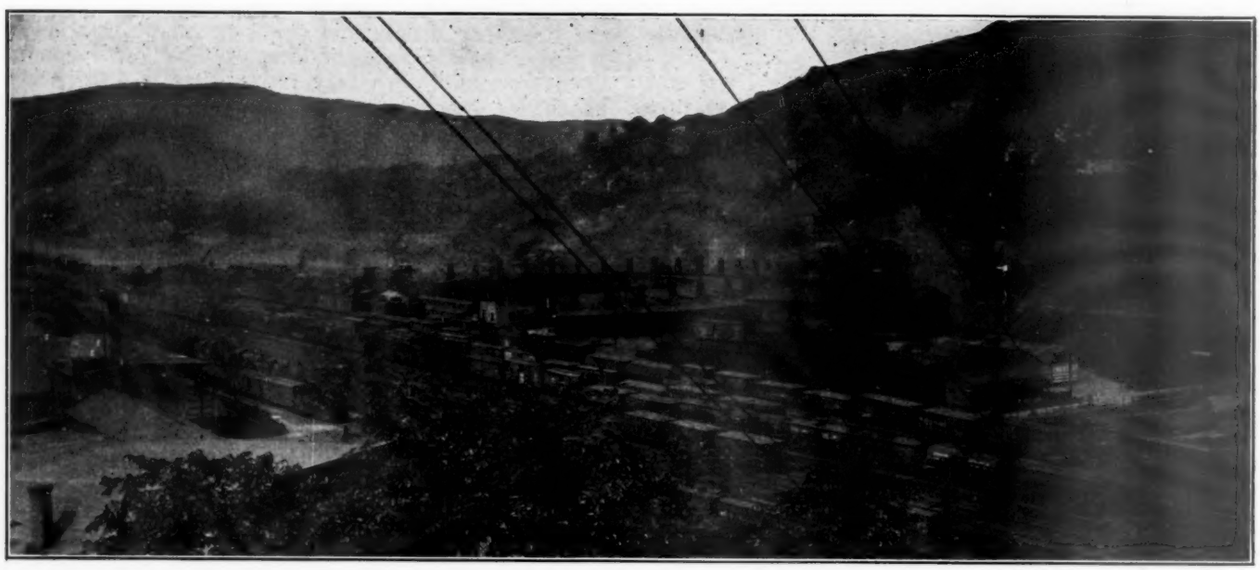
Mr. Fairbanks, general secretary of the American Railroad Association, stated yesterday that its headquarters in Chicago will be as large as those in New York. They will be located in the Manhattan Building. The activities of the mechanical, engineering, traffic and transportation sections will be carried on from Chicago, and the general secretary will have an office there. The general secretary will also have an office in New York. The treasurer will be located there, and the activities of the operating, telegraph and telephone, signal and transportation and purchase and stores section will be carried on from New York.

The Cure of the Model Hater

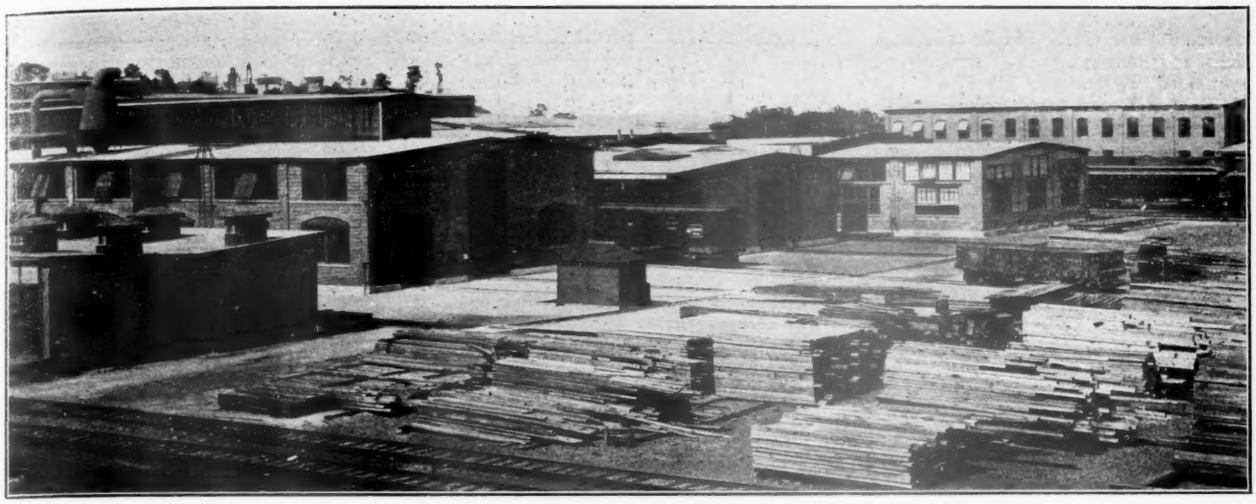
"How do you do, Mr. X. What do you think of the convention this year?" The Man who saw turned his head to hear the reply.

"Why, hello, Dick. It's the best I ever saw. I'll take off my hat to the far-sighted crowd who brought these splendid exhibits here. And, Dick, I'm going to make a confession. For years, as you know, I have declined to look at the models you have so patiently dragged around for my benefit—and other fellows like me. Models, to me, have always been a bore, but now I am cured. I have spent four straight hours looking at models and nothing else, and I'll say frankly, that I wish I had more time."

The Man thought of unconverted others of his type who, safely fortified in their private offices, politely declined to give the "once over" to carefully constructed models which were made for their sole education and brought to their very doors. Truly, the "greatest convention" is a converter as well as an educator.



Erie Yards and Roundhouse at Susquehanna, Pa.



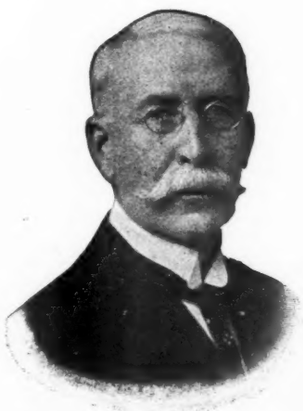
Delaware, Lackawanna & Western Car Shops at Kingsland, N. J.

American Railway Association, Section III, Mechanical

Report of the Proceedings of the Wednesday Afternoon and the Thursday Sessions

The Wednesday afternoon session was called to order by Chairman Chambers at 3:15 o'clock.

The Report of the Arbitration Committee



J. J. Hennessey
Chairman

DURING THE YEAR, Cases Nos. 1148 to 1155 have been decided and copies sent to the members. A vote of concurrence in the decisions is respectfully asked by the committee. With the approval of the General Committee, this committee has continued the rendering of interpretations of such questions as have been asked by the members regarding the rules.

The committee recommends, as the Master Car Builders' Association has become a part of Section III —Mechanical, of the American Railroad Association, that all reference hereafter to the Rules of Interchange, Loading Rules, Specifications, etc., and all printed forms issued in connection with the interchange, repairing, billing, defect carding, etc., be changed to conform therewith, i. e., be designated as "A. R. A." instead of "M. C. B."

Changes in the Rules of Interchange Recommended by the Committee

Rule 9

The committee recommends the following addition to Rule 9:

Journal Boxes: Periodical repacking, per Rule 66. { "Length of journal. Date previously repacked or 'No date.'"

This information will be required if the recommendation for repacking journal boxes under Rule 66 is approved.

Rule 12

The committee recommends that the fourth paragraph of this rule be amended to read as follows: "Joint evidence must be obtained within 90 days after first receipt of car home and said joint evidence shall not be valid unless used within 16 months from date of issue."

We feel there should be a time limit within which joint evidence must be used. As there is a twelve-month limit upon the rendering of bills, there should be some additional time allowed the car owner to make use of joint evidence.

Rule 17

The committee recommends the following interpretation of Section B of this rule, to be included in the revised rules: "Q.—Are special steels, or alloy steels, considered to be the equivalent of and permissible in substitution for malleable or gray iron A. R. A. standards A.—Yes."

The committee recommends that the following interpretation of paragraph (e), as shown on page 31 of the 1916 Rules of Interchange, be reinstated and shown in the Rules when revised for 1919. "Q.—When substitution of different makes of M. C. B. metal brake beams necessitates changes in brake hangers or connections, is the company making the repairs liable to the car owner for wrong repairs on account of these hangers, etc., being different from that standard to the car? A.—The association has no standard method of hanging beams, and until such a method is adopted the standard to the car must be maintained." The committee feels that this interpretation is necessary to properly protect the car owner.

Rule 32

The committee recommends that Rule 32 be rewritten as follows: (Delivering Company Responsible.)—"Dome covers or safety valves missing from tank cars. Material missing from cars due to handling on unloading machines. Removing or cutting out parts of car to facilitate loading or unloading. Known theft of parts of car occurring on handling line.

"Damage to any car (including cars on ferries or floats) if caused by: (a) Derailment. (b) Cornering. (c) Sideswiping. (d) Collision or impact other than that occurring in regular switching. (e) Handling of cars with broken or missing couplers, or couplers out of place. (f) Colliding with or shoving over bumping post or other fixed obstruction. (g) Shifting of

loads from other cars. (h) Overloading. (i) Explosion. (j) Collapsing buildings or other structures on right-of-way. (k) Unconcealed fire damage. (l) Flood. (m) Storm where car is derailed or destroyed. (n) Failure to close hopper or drop doors before moving car."

These changes are intended to better cover those causes of damage which should be considered as unfair usage and more clearly outline such causes and the loss of certain parts of cars which it is felt are properly a handling line responsibility, and to eliminate the indefinite term "wreck."

Rule 33

The committee recommends that the first paragraph of this rule be rewritten to read as follows: "Owners will be responsible for the expense of repairs to safety appliances where not involved with other delivering line damage, except damage to running boards on tank cars when sideswiped or cornered."

Rule 58

The committee recommends that Rule 58 be reinstated to read as follows: "Delivering company responsible when cars are offered in interchange with missing brake cylinders, reservoirs, triple valves, pressure-retaining valves, cut-out cocks, angle cocks or air hose, each or all complete." Also that reference to Rule 58 be added to Rule 43 as an exception.

Rule 66

The committee recommends that Rule 23, as printed in Circular No. 25, issued January 1, 1919, be incorporated in the Rules of Interchange as Rule 66, and amended to read as follows: "Owners responsible.)—Periodical repacking of journal boxes, regardless of the responsibility of delivering company for change of wheels, journal boxes or journal bearings. No charge shall be made for repacking unless all boxes are repacked. No charge shall be made if the repacking is done within nine months from date stenciled on car. If car bears no stenciling, showing date of previous repacking, all journal boxes may be repacked, if necessary, and charged for.

"(a) All journal boxes shall be repacked with properly prepared packing (new or renovated) at least once every twelve months, at which time all packing will be removed from the boxes and the boxes cleaned; dust guards to be renewed when wheels are changed.

"(b) The date and place (railroad and station) where the work is done must be stenciled on the car body near the body bolster at diagonal corners in 1-in. figures and letters, using the same station initial that is used for air-brake stencil.

"(c) This work to be done as far as possible when cars are on repair track undergoing heavy repairs. When on repair track for heavy repairs, cars which have not had boxes repacked within nine months will have all boxes repacked and the record stenciled on the car as above.

"(d) This does not contemplate any change in the intermediate packing of boxes when it is necessary to do so. No change should be made in the stenciling unless all boxes are repacked."

Rule 88

The committee recommends that Rule 88 be rewritten to read as follows: "In order that repairs of owners' defects may be expedited as fully as possible, foreign or private line cars may be repaired by the handling line by using material from their own stock instead of ordering material from car owner, as prescribed by Rule 122, in which event the repairing line must issue its defect card for the labor only of correcting such improper repairs, and defect card should be so marked.

"In case of delivering line defects, defect card shall be issued for both labor and material for correcting the improper repairs."

Rule 90

The committee recommends the elimination of the last exception in this rule, reading "except in cases covered by Rule 88."

Rule 94

The committee recommends that the third paragraph of this rule be changed to read as follows: "If the owner elects to dismantle the body or trucks, or both, charge may be made for such material as would have been required for the repairs covered by the defect card, but such charges to be confined to the actual material stated on card and items of labor for straightening or repairing material returned to store stock. No other labor shall be charged in such cases except in so far as labor is already included in the A. R. A. prices for material."

Rule 95

In referenec to a recommendation that this rule be changed to include missing brake beams and other brake details, as formerly covered, the committee recommends the rule remain as at present for the reason that in case of bills for defective or missing brake beams, the average credits allowed under Rule 101 are high enough to offset the value of occasional missing beams, and the billing is thereby greatly simplified. Furthermore, the condition of the missing beam cannot be ascertained and is no doubt frequently defective.

Rule 101

The committee recommends that the following items be inserted in Rule 101 to provide for the charge for the periodical repacking of journal boxes as per Rule 66: "Journal Boxes, periodical repacking of, per car, net:

149-a.	For journals 7 in. long and over, but not 8 in.	$1.75
149-b.	For journals 8 in. long and over, but not 9 in.	2.10
149-c.	For journals 9 in. long and over, but not 10 in.	2.35
149-d.	For journals 10 in. long and over, but not 11 in.	2.50
149-e.	For journals 11 in. long and over.	2.80"

Rule 108

The committee recommends that Rule 108 be rewritten to read as follows: "No labor to be charged for the inspection of cars, testing or adjusting brakes, adjusting angle cocks, tightening unions or spreading cotters; sill steps, ladder treads or handholds, tightening or straightening on car.

"No material or labor to be charged for the following items of repairs: 1. Air-hose gaskets, applied, except with hose complete, applied. 2. Brake pins or key bolts, applied. 3. Brake ratchet wheel keys, applied. 4. Brake-shaft rings, applied. 5. Brake-shoe keys, applied. 6. Carrier iron, Bettendorf type, when turned over, no charge for adjustment. 7. Coupler release clevises, clevis links or chains, clevis pins or bolts, applied. 8. Lag screws, applied, except when used to complete other items of repairs not herein listed. 9. Nuts or lag screws, tightened. 10. Nuts, ¾ in. or less, applied, except when used in renewal of bolts. 11. Nut locks, or lock nuts, applied. 12. Release-valve rods, repaired or applied. 13. Straightening brake shafts and uncoupling levers when not removed from car. 14. Spring cotters and split keys, applied. 15. Staples, applied. 16. Wood screws, applied, except when used in renewal of running board. 17. Washers, applied, except when used in renewal of bolts.

"No charge to be made for the material or labor of lubrication, except as provided in Rule 66."

Rule 120

The committee recommends that the fifth item under Paragraph "B," "Repair Limits for Labor," be corrected to read as follows: "All steel and steel underframe cars, excepting steel or steel underframe flat cars."

The report is signed by J. J. Hennessey (Chairman), Chicago, Milwaukee & St. Paul; P. F. Smith, Pennsylvania Lines; James Coleman, Grand Trunk; F. W. Brazier, New York Central; T. H. Goodnow, Chicago & North Western; J. J. Tatum, United States Railroad Administration, and George Laughlin, Armour Car Line.

Discussion

After the reading of the report, the Secretary made the following statement: At a meeting of the Arbirtation Committeee, held last night, the committee decided to recommend the following changes in Rule 36:

"To be permitted only on cars loaded with perishable or fragile freight and on tank cars containing dangerous articles as per I. C. C. regulations."

Also, that the following be added to the last paragraph of the same section:

"Commodity cards required on tank cars may be pasted, glued, or otherwise secured."

Also, that the second sentence in second paragraph of Section 3 of this rule, be changed to read as follows:

"Placards and certificates on empty cars, except inflammable and commodity placards on tank cars, must be removed."

Reason: Apparent conflict between above M. C. B. rule and paragraph 1712 of I. C. C. regulations relative to use of commodity cards on tank cars containing dangerous articles.

On motion the report was accepted as read.

Report on Prices for Labor and Material

P. F. Smith, Jr.
Chairman

THE COMMITTEE after the 1915 M. C. B. convention took up the work of analyzing the prices for labor and material (as outlined by the Committee on Compensation for Freight Car Repairs in their report to the 1915 convention) as instructed by the association. For the 1916 convention the report presented gave a general outline of the method being followed in carrying on the work, and included a list of items for Rules 101, 107, 108, 111, 116 and Passenger Car Rules to be added and changed. This report was adopted and the revised 1916 M. C. B. rules included the changes in items and prices as suggested.

For the 1917 convention the report presented covered all items for labor and material for freight and passenger car repairs, and specified that during the coming year the studies of the committee would include the direct and overhead charge for yard repair work as compared with shop track work; center, intermediate and side sill renewals; tank car repair studies; items per Rule 111; also giving further consideration to material prices and making recommendations for alterations in such prices as might be found necessary. This report was adopted, subject to the modifications which the Price Committee had in mind and that were reported upon at the meeting held in Chicago, but the items for labor and material as reported on were not introduced in the M. C. B. Rules of Interchange, and the proceedings do not give any reasons therefor; further, the Price Committee was not informed or given any instructions how to proceed in the future.

For the 1918 meeting the report presented, due to abnormal conditions existing at that time, was to the effect that the items for labor and materials, as printed in the 1917 revised M. C. B. rules, should stand, but the percentage to be added should be increased to 50 per cent. On this report apparently no action was taken, as the proceedings make no mention of such a report, further; price details were taken care of by the Arbitration Committee.

In view of the above, the committee asks for further instructions. If it is decided to continue this committee, we suggest that the work left unfinished in our 1917 report be continued, and the entire price schedule be revised to date and submitted to the 1920 convention. We further recommend in the revision of time allowances that time basis be used and the hours divided on the decimal plan in multiples of tenths.

The report is signed by P. F. Smith, Jr. (Chairman), Pennsylvania Lines; G. E. Carson, New York Central; J. E. Mehan, Chicago, Milwaukee & St. Paul; Ira Everett, Lehigh Valley; Willard Kells, Atlantic Coast Line; E. S. Way, General American Tank Car Corporation; H. L. Osman, Morris & Co.; G. F. Laughlin, Armour Car Lines, and A. E. Smith, Union Tank Line.

Discussion

In the last year and a half the prices of both labor and material were continually shifting, but your committee has considerable data on time studies that were made for the various items in the rules, so that we can now go ahead if the Association so desires.

A motion to accept the report was carried.

Report on Depreciation for Freight Cars

IN ORDER THAT the committee's conclusions might be based on representative factors as to average life and residue values, Circular No. 35 was issued requesting data on equipment dismantled during a period of three years ending December 31, 1917. This period was taken because it represented normal conditions more nearly than those existing during 1918. This information was requested by classes in three groups—wooden cars, wooden cars with steel underframes and cars of all-steel construction.

Replies were received from 55 railroads and 7 private lines, representing the ownership of 2,023,783 cars and covering 106,010 cars dismantled during the three-year period, a summary of which is shown below:

CARS WORN OUT AND DISMANTLED.

(Cars retired in connection with rebuilding are not included.)

ALL WOOD CARS.

Class of Cars.	No. of Cars.	Average Life of Cars in Years.	Scrap Value.
Box	47,672	22.3	12.2
Stock	5,201	20.1	12.1
Flat	6,800	22.3	17.1
Gondola	24,630	18.0	14.7
Hopper	16,082	20.3	14.4
Refrigerator	4,591	21.7	12.3
Tank	81	24.6	31.5
Weighted Average	105,057	20.9	13.5

ALL STEEL CARS.

Class of Cars.	No. of Cars.	Average Life of Cars in Years.	Scrap Value.
Gondola	817	13	11.7
Hopper	136	14.7	17.2
Weighted Average	953	13.1	12

The information furnished regarding wood cars with steel underframes was very limited and not representative of average conditions, and the committee did not feel justified in using it.

The average life of railroad owned wooden refrigerator cars dismantled was 17.1 years and of private line wooden refrigerator cars dismantld 21.9 years, making the average life for all wooden refrigerator cars dismantled 19.4 years. However, the average life of railroad owned wooden refrigerator cars is very largely affected by two lines reporting the dismantling of a large number of cars of an average life of only 15 years, which is much lower than the general average for all railroad owned wooden refrigerator cars, and by excluding these two lots of cars the results are as follows:

Railroad owned wooden refrigerator cars dismantled...21.3 years
Private line owned wooden refrigerator cars dismantled.21.9 years
Average life for wooden refrigerator cars dismantled...21.7 years

which your committee feels should be taken as the average life of wooden refrigerator cars and which has been shown in the table.

In order that the information would be obtained on a uniform basis, the committee asked that the scrap value be expressed in the percent of the M. C. B. price of the car, as shown in Rule No. 112 in the 1918 M. C. B. Rules, using the 1918 price for scrap.

From the information secured we obtained a weighted average percentage of scrap of the M. C. B. value new, on all wooden cars, of 13.5 per cent. It is the opinion of the committee that ¾ cent per pound is more nearly representative of the average current market price for scrap than ½ cent per pound as quoted in the present M. C. B. Rules, which would increase the weighted average percentage from 13.5 per cent to 20.25 per cent.

In settling for destroyed cars, recognition should be given of the fact that the car has a value to the owner above that of the actual value of the scrap to the line destroying the car, and further, that there is considerable serviceable material on which the line destroying the car can obtain the secondhand instead of the scrap value. If 20.25 per cent represents the value of the scrap to the line destroying the car, the committee does not feel justified, in the absence of any other figures, in recommending any change in the provision of Rule No. 112 which provides that in no case shall the depreciation exceed 60 per cent of the value new.

The weighted average life of all classes of wooden cars was found to be 20.9 years, as indicated in the above table. We have no information as to the average life of cars of steel underframe or all-steel construction, in the absence of which we would suggest, that on such cars, other than gondola or hopper cars, the same rate of depreciation be used as on wooden cars, until such time as experience may warrant a different rate.

The weighted average life of all classes of open top steel cars was found to be 13.1 years, but on account of the committee having knowledge that the cars reported as being dismantled during the period did not represent the present standard for this type of car we are inclined to believe that the information does not represent the average life of this class of equipment and, pending the time when experience will warrant a revision, the committee recommends considering 17½ years as the average life for open top steel cars. Based on the average life as indicated in the above table for wooden gondola cars, the committee suggests that wooden and steel underframe gondolas and hopper cars, for the purpose of depreciation, be included with similar cars of all-steel construction.

Opinions were requested as to whether depreciation should be applied on air brake values at the same rate as for car bodies and, on a car-owned basis, the majority of the replies favored depreciating both 8-in. and 10-in. air brakes at the same rate as the car body, which is recommended by the committee. The majority of replies to the question about depreciation of trucks, considered on a car-owned basis, favored having the trucks carry their own rate of depreciation and having that rate less for all-metal trucks than for composite trucks. However, the committee finds that the rate of depreciation of car bodies should be reduced to 3 per cent and 3½ per cent, according to construction, and we do not feel that a rate less than 3 per cent for trucks is justified; therefore we recommend that the trucks be depreciated at the same rate as the car body to which they belong.

In view of the information at hand, the committee submits the following recommendations for the depreciation of freight cars:

STRAIGHT DEPRECIATION BASIS.

Items.	1918 Rules of Interchange. Per Cent.	Proposed Rate. Per Cent.
Wooden car bodies, except gondolas and hoppers.	5.5	3
Wooden car bodies, gondolas and hoppers	5.5	3.5
Wooden car bodies with steel underframes, except gondolas and hoppers with steel underframes	4.5	3
Wooden car bodies, gondolas and hoppers	4.5	3.5
Steel underframe flat cars	5	3
All-steel car bodies or those with steel underframes and steel superstructure frames, except gondolas and hoppers	4	3
All-steel car bodies or those with steel underframes and steel superstructure frames, gondolas or hoppers	4	3.5
Tanks for non-corrosive material	4	3
Tanks for corrosive material	5	3.5
Air brakes	None	Same rate as car body.
Trucks	Same rate as car body.	Same rate as car body.

The age of the car body shall govern in figuring depreciation on air brakes and trucks.

The depreciation rate for the class of car shall govern in figuring depreciation on such betterments as are listed in Rule 112 and shall be figured from date of application.

In its study of the subject of depreciation your committee was confronted with the question of rebuilt cars, and believes that this should be referred to a committee for consideration, and suggests this committee, if appointed, be requested to take up the part of Rule 112 which provides that in no case shall the depreciation exceed 60 per cent of the value now.

The report is signed by M. K. Barnum (Chairman), Baltimore & Ohio Railroad; J. Hainen, Southern; L. K. Sillcox, Chicago, Milwaukee & St. Paul; A. E. Calkins, New York Central, and H. L. Osman, Morris & Co.

Discussion

C .E. Fuller (U. P.): I think this committee should be either continued or another committee appointed to take up the question of rebuilt cars. That subject is very pertinent and one we ought to have settled. There is quite a diversity of opinion as to the value of a rebuilt car, especially the refrigerator cars, and now, with steel underframes and the betterments and improvements on the car, they place that car in a class by itself. I think the subject should be thoroughly considered and a report given on it by this committee.

Chairman: If there is no objection, that will be included in the motion—that the report be accepted and the committee requested to continue the investigation in accordance with the recommendation of Mr. Fuller.

F. F. Gaines (U. S. R. A.): I would like to hear from some member of the committee as to what ground they justify the limitation of 60 per cent and that the scrap value lies between 12 and 13.5 per cent. If you leave 40 per cent there which you cannot get back, you are penalizing somebody; the owner of the car, in other words, can only get 60 per cent value of the car up to its 20 year life. I do not understand why the figure of 60 per cent is the dividing line, and have never understood it.

R. L. Kleine(Penna. Lines): I think the average life of 20 years for wooden cars seems to be right, and what would be expected, although during the early portion of this life, wooden cars were not subjected to the severe strains of being hauled with steel cars and in heavier trains.

No steel or steel underframe cars have been retired on the Pennsylvania Railroad on account of being worn out, and the first of these cars was built in 1898. The life of a steel or steel underframe car will naturally be longer than that of a wooden car, since during the first ten years of the life of such a car the total cost of repairs, aside from running repairs, would be about $100. After the tenth year, and until it is 25 years old, the car will require normally, barring accidents, in turn a new floor, possibly new side sheets, and another floor, which may carry the car until it is 32 years old. Around that time the cost of maintenance per year will be much higher, as it will not have the initial ten years' low maintenance cost of a new car, and then it becomes a question of whether to maintain such a car or build a new one. This would be decided by taking into consideration the yearly costs of maintaining the old car and the cost of building a new car, including the interest on investment and the depreciation.

With the value of scrap in a car representing the per cent of the original cost of a new car, the limit of depreciation in per cent should be the difference between 100 per cent and the per cent representing the value of the scrap, both figured in normal times, and if the price of either scrap or new car should materially change, the percentage could be adjusted accordingly, although they generally run hand in hand. That is, if the cost of the car new is materially increased, the value of scrap generally increases correspondingly. Under all conditions the total value of the car (100 per cent) should be made up of the limit of depreciation in per cent, plus the value of scrap in per cent. The value of scrap recovered from destroyed and badly damaged cars is not worth more than the scrap rate net to the handling line, as there is a very small percentage of this material that can be used in repairs.

Since January 1, 1918, the Pennsylvania Railroad Company reclaimed, at the request of the regional director, all serviceable parts from destroyed foreign cars, recorded and tabulated them, and submitted lists to the car owners for instructions as to what items they desired shipped home. Very few items were desired, and these were mainly truck sides and truck bolsters of the latest design, and the majority offered no more than scrap rates, plus the expenses of handling.

The conclusions are: 1. The yearly rate of depreciation for badly damaged cars or maximum allowable depreciation should be such that neither the owner nor the handling line would make money in settlement for destroyed cars.

2. On account of the different retirement programs and rates of depreciation used by various roads, a definite life should be established for wooden, steel underframe, and all-steel and tank cars, or at least a definite time at which depreciation should cease as a basis for settlement of cars destroyed: 20 years for wooden cars and 27 years for steel cars.

3. The limit of depreciation should be a percentage based on the value of new cars (normal times) to the value of scrap

(normal times) obtained from the car at time of destruction: 20 per cent scrap value, and 80 per cent limit of depreciation.

4. The rate of depreciation should be the number of years established for the life of the car divided into the limit of depreciation: 4 per cent for wooden cars, and 3 per cent for steel cars.

5. Provision should be made for return of trucks at the option of the destroying line.

6. Rate of depreciation should be the same for trucks and air brakes as for body of car.

7. The M. C. B. values now have been increased 55 per cent in the last two years, and the arbitrary values of betterments were increased 100 per cent without any of the depreciation rates being changed and the long standing practice of depreciating betterments from the original date the car was built was superseded by depreciating from the date applied, which makes it difficult for the handling line to estimate depreciated values of such cars. Unless arbitrary values are reduced, the maximum allowable depreciation should be increased, in order that the remaining depreciation may represent only the value of the scrap in the car.

8. If the low yearly depreciation rates, as recommended, be adopted, it would prohibit roads from settling for many damaged foreign cars, on account of the high settlement price, would result in more old wooden equipment being maintained instead of getting this weak equipment retired and might result in additional building of wooden equipment. There are thousands of old wooden cars, especially of low capacity, which will not stand up under ordinary service, and are a danger to themselves, to other equipment, to the roadbed and to life, and when such cars fail to the point of destruction, they generally cause considerable expense to the handling line by damaging other cars and the roadbed.

Furthermore, the corporations set up a yearly depreciation for the cars, and the depreciation which the Association set ought to more nearly approximate what the corporation has already in its accounts.

Mr. Gaines: I think that this convention will take a big step backward to put in that old method of depreciation on equipment. The only way you can get at it rationally is to take 100 per cent, minus your scrap and divide by the life of the car for your yearly depreciation, and I think if we adopt this report as a whole, we are taking a step backward.

Chairman: I have had some experience with these items, and I never did agree to it in my own mind. The depreciation has never been right, and there is no reason at all for the wide gap between the Rule 120 basis and 112, and I favor a little more latitude than 120, so that there will not be any incentive for a man to destroy a good car if he happens to damage it, and finds he can pay for it more cheaply than for the repairing; but there should be a basis so that at the time when a car was dismantled there would be an established figure that can be represented in dollars and cents. I think we could and should establish it before we drop this subject, or recommend rather some basis that seems sensible and will bear argument.

Mr. Giles: It appears to me that some further consideration should be given to establishing a different basis for figuring the depreciation of trucks, especially steel trucks under modern equipment, than that which is used in arriving at the depreciated value of the body of the car. The trucks do not depreciate as rapidly as the body of the car does, either in steel or wood, and I have always been in favor of establishing a different basis for the trucks.

Mr. Goodnow: It is not brought out in this report at all just what consideration was given the present value of cars. The Arbitration Committee is accepting as the basis of settlement the book value of the car purchased since 1914. Prior to that time the cars go on the arbitrary values as established in the M. C. B. rules. That took care of the war conditions which prevailed, but in the settlement for cars built in the years just prior to 1914 and cars which may have been contracted for and delivered in 1914, and for the cars that have been bought under the present prices, there is no difference, as an earning unit to your company. There were cars built in 1912, 1913, and 1914 that will go along for years and be just as good as a car built since 1914. They represent only about one-third of the value of the car that has been built since that time; so that if this is to be analyzed right, there must be some basis of settlement or of cost set up to take care of the depreciated value. I don't know if the committtee gave any consideration to that in their recommendations.

Mr. Calkins: The committee had that subject in mind, but according to the instructions it had, it did not consider it was to go into anything other than the rate of depreciation.

Mr. Goodnow: You mentioned just prior to that that you depreciated on the M. C. B. prices.

Mr. Calkins: That was in determining the value of scrap, as compared to the value of the car. We did not get any of those new values because all the cars dismantled were of the type that came under the old arbitrary value established by the Association.

Mr. Goodnow: I don't think the rate of depreciation is half as important as setting up proper values, because what we would actually lose, whether it is three or five per cent, in depreciation, does not represent the value of cars to your company today under present prices, although they may have been bought just prior to 1914. This matter of reconciling the M. C. B. depreciation and that set up by the various companies on their books was attempted about two years ago, and at that time the depreciation as carried by the companies varied so much that it was impossible to reconcile it at all. It ran from one-half of one per cent up to 3 per cent or more, so that at that time there was no common depreciation, as between the companies, on the equipment.

Mr. Kleine: It would be a simple matter to cover Mr. Goodnow's point in regard to the various prices paid for cars during recent years. You could establish a basis for normal times, and as the cars increased in price in following years, you could use that as a base and add a percentage. But the rate of depreciation, and the total depreciation of the car, is the thing that should be established as a fixed basis. We have had enough experience with the wooden cars to know what that is, and I think the committee brought that out very nicely. It is about 20 years; that is our experience also, but I think the committee is wrong in stating 60 per cent. If 80 per cent were used to represent the depreciated value of the car and the 20 per cent remaining in the car the scrap value, it would be approximately correct.

Mr. Calkins: We did not set the 60 per cent limit. We had this 20 and 80 per cent figure in our mind, too, but we thought the thing ought to be carried over, as we suggest there, to the committee, who will go on with this work another year. The last paragraph says: "And suggests this committee, if appointed, be requested to take up the part of Rule 112 which provides that in no case shall the depreciation exceed 60 per cent of the value new." We did not change the present practice.

Mr. Tatum: I was wondering how these figures are arrived at. We place the average life of wooden cars at 22 and 23 years. The average life of a wooden gondola is 18 years; steel is placed at 13 years. In considering the repairs to steel cars when repairs or rebuilding is necessary, you are required to renew the floor sheets and the side hopper sheets possibly. The side sheets of the car are fairly good, yet 50 per cent of the life is gone. In repairing a wooden gondola car, if you are required to renew the floor and side hopper planks, the planks may all be there and intact, and for the reason that they do not depreciate by deterioration they are worth as much in the rebuilding of that car as if they were new. It is well seasoned, hardened and in good condition, and as the car is rebuilt with the new floor and side planks, as it may be, or end sills, these old side planks applied to the rebuilt wooden gondola car are just as good as if new. It would not be so with the steel car, because if you apply a new steel floor to the steel car, or perhaps new sills, the side plates of that steel car have depreciated 50 per cent or probably 75 per cent, and maybe it would not justify the rebuilding of that car, or scrapping it, and building a new body, as it would the wooden car. By that method you are able to increase the life of the wooden car, if you don't consider the rebuilding along with the scrapping of the car, while with the steel car you shorten the life. If we take a steel car and compare the cost of rebuilding it or repairing it, you might find it just as cheap to build an entire new steel body, as it would be to repair the old steel body. There have been some test cases made where there was only $50 difference between the building of a new steel body and the repairing of an old steel body. It is very expensive to get the car down so that you can apply new parts and build it up, while you can use the oxy-acetylene or other methods, and cut the steel down, put it in the scrap and use the money you save in cutting out the rivets to

apply to the new body, and practically get an entire new body for what you pay for the repair or rebuilding of the old body. Has the committee considered the cars having had new bodies built, and the old bodies scrapped? If you continue the trucks, draft gears and air brakes, and simply build a new body, you can add considerable life to a steel car, just as much as you can to a wooden car by renewing the defective parts.

Mr. Hennessey: The committee is up against a very hard proposition when it attempts to get the average depreciation of a wooden car or a steel car. You may build a wooden car, and use material in that car that will depreciate to a very small per cent; I may build from the same drawings a car practically out of sap. It will depreciate twice as fast as a car that is built out of good material. I have inspected some 100,000 gondola cars that in 8 years are practically fit for the scrap heap; I have inspected other cars that have the same cubical capacity, but instead of having been built 38,000 lb. in weight when new, a good car was built about 45,000 lb. That car had the great factor of safety, and depreciation was very small in per cent, as compared to the car that was practically a tin pan. The same is true with the wooden cars.

Mr. McBain: The committee should consider an arbitrary point of depreciation at some point above the actual scrap values. It should take into consideration the maintenance of that car in the service, depending on the maintenance policy of the owner. Any car that is maintained in serviceable condition, so as to pass interchange and carry the load to destination, certainly must have a value somewhere in excess of the actual scrap in the car. I urge that the committee consider that point before it reaches a final conclusion.

Mr. Gaines: I would like to amend the motion that is now before the house to this extent: That the report of the committee be accepted, but in publishing this report we substitute for the method of depreciation, the plan of using 100 per cent, minus the scrap value divided by the life of the yearly depreciation.

Mr. Kleine: I second that amendment.

Mr. Calkins: I don't quite get that point. Do I understand then if you have a $1000 car, and it runs 5 years, and is destroyed, and is worth $200, that you have got to account for $800 in depreciation in the five-year period? What is to be the life of it that you use for that divisor?

Mr. Gaines: The estimated life is 15 or 20 years, whatever you adopt.

Mr. Kleine: That simply substitutes the depreciated rate, or to establish the depreciated rate, we take 100 per cent, subtract the scrap value, divide the life into that and get the rate of depreciation, whereas in my suggestion I had set a definite life.

Mr. Tatum: I understand Mr. Gaines' motion is that the committee or the Association fix the life of the car. For example, say that they have established a life of 20 years or 30 years, or whatever it may be, if a car costs $1000 and the scrap value is $200, and they divide the $800 remaining above the scrap value into the age of the car, that would be its depreciated value per annum.

Mr. Gaines: I would say it is my intention that we take for the present, until we get different figures, the estimated life given in this report and use that as the basis to work on.

Mr. Calkins: When a car reaches the estimated life, it is worth nothing but scrap value, according to the process of reasoning used. There is always some value in a car above its scrap value, if it is used as a unit of equipment, and is in condition to be so used. At the end of 17.5 years a steel car is worth $200 as scrap value, according to this report. I still believe there is more value in the car than its scrap value at that time.

Mr. Tatum: Is it Mr. Gaines' intention to accept the figures of 13 years as the life of the steel car?

Mr. Gaines: I had in mind 17.5 years. We should accept these figures as the best we have obtainable at the present time, with the understanding that the committee will give further attention to the subject and report at a later time. You can extend the life of a car, or cut it down, but you must make an arbitrary life, and my suggestion is that we accept the committee's report this year as to the life.

Mr. Goodnow: I understand the motion which was first made was to receive the report of this committee, and that the committee should be continued, to give further study to the subject, particularly with reference to rebuilt cars. Representing a company which owns and operates cars, I am not ready, without a chance to give further study to this subject, to vote one way or the other on such a motion, and I think, without establishing some rule as to how your scrap values and similar matters are to be arrived at, we never would settle for a car. I do not think this convention is in any shape to act on a motion now, and I think we had better go along for another year with what we have at the present time.

Mr. Gaines: The committee has worked out the scrap value and it has given averages. The proposed amendment is superior to the old methods of the 60 per cent limit, and has some rational basis at the bottom of it, which the other has not, and we must adopt some rule for handling the business this year.

Mr. Goodnow: If you can arrive at some standard of value for cars, you are right, but in the absence of that, I believe a car built in 1913 will earn as much money as one built in 1915, and there is a wide line of settlement on the original values of these cars.

Mr. Fuller: Do you mean you would accept 14 years as the life of a steel car?

Mr. Gaines: That part of the report does not agree with my experience, but I am willing to ride with that part of the report.

Mr. Fuller: It does not seem right to put the period of life of a steel car, gondola or hopper, at 14 years, when the figures show that the life is 17 years as an average. Every one knows that if the steel car is taken care of it has many more years of life than 14 or 17 years.

Mr. Tatum: Some of the railroad companies are tearing down and settling for a car which was in bad condition, rather than to rebuild a car.

Suppose the car is 17 years old, and it has been maintained in fairly good, serviceable condition. It goes on a road and it is damaged, and the managers of the road say—"We will settle for this car, we will not repair it. There is $200 worth of scrap in it, it will cost us $300 to repair it. By settling for it we will save $100, and we will settle for it." I do not think that is good and I am sure that is what will happen if Mr. Gaines' motion prevails.

Mr. Goodnow: Under Mr. Gaines's motion the scrap value is the only thing to be considered, and it reflects back to the value of the car as it is established under an arbitrary figure, and as it is represented in value on the books of the company.

R. L. Kleine: The present rates of depreciation are too high. Mr. Gaines wants to extend the life of the car to a longer period—instead of 60 per cent of the value of the car he wants to extend it to 80 per cent, or 100 per cent less the scrap value. That means anywhere between 15 and 20 per cent. The committee has found that the life of the average wooden car, torn down as worn out, is about 20 years. We have data on wooden cars, but in connection with the steel cars, we have not any such data. We have steel cars build in 1898, which are now 20 years old, but we have not torn down a single one of these cars on account of being worn out.

If we establish 20 years as the life for the wooden car, as recommended by the committee, and run the depreciation to 80 per cent of the value of the car, that will give 4 per cent a year depreciation. In the case of the steel car, we do not know what it is, and no matter how much investigation is made, we have to wait until the end of the normal life of the car to determine it. We will have to estimate it for the present.

J. H. Milton (Rock Island): Suppose a car has been running 15 years. Do I understand that we will depreciate that car on a 20-year basis, notwithstanding the fact that we may have practically rebuilt the car, and spent $700 or $800 on the car, reinforced it in every way, and added years of life to it? It seems to me when that amount of money is spent on a car we change the life of the car and in my opinion it should be considered as a new piece of equipment.

L. K. Sillcox (C. M. & St. P.): I want to point out one of the conditions prevailing today. We settle on a car basis, according to the cheapest method, we either fix the car up to stand the pull, or settle with the owner, and our experience has been that we have a vast majority of steel cars on our hands for which we have settled. The committee has reported a less rate of depreciation than that which was formerly used, and I think it is on the right track. We had to use figures based on information which was furnished.

The evidence which has been submitted with respect to the steel cars does not cover a long enough experience, and shows cars taken out of the service which have a short life naturally.

There are cars running in the Illinois territory which have eight years of service, and that is the normal condition in the coal traffic in that section, whereas if you take the same cars out in Colorado, where the conditions are not so severe, the same type of car might run 15 years, and yet be in good shape. The point I want to make is this—that we are settling for cars today which are in good shape, because it is the cheapest way to do it. A lot of these cars could be continued in service if there was a less rate of depreciation prevailing.

E. S. Way (Gen. American Tank Car Corp'n): I do not think it is wise to take any hasty action on the amended motion before us. I wish to offer another amendment, that the subject be referred back to the committee for further consideration, and that the committee give weight to the value of a tank car, as well as the scrap value, and allow for the maintenance of the car.

Mr. Calkins: Under the present rate of depreciation, which I think is too high, a car at the rate of 5.5 per cent depreciation reaches the 40 per cent limit in 10¾ year; at the 4.5 per cent rate of depreciation, it reaches the 40 per cent limit in 13.3 years; at the 5 per cent rate of depreciation, it reaches the 40 per cent limit in 12 years, and at the 4 per cent rate of depreciation, it reaches the 40 per cent limit in 15 years. I believe the work of the committee should go further, and take up the question and determine the facts regarding the rebuilt car.

Mr. Milton: Take a steel car that costs $1500 when you bought it, and it is depreciated down to $500. We repair it and use $1000 worth of good material with $500 of partly worn-out material; it has only 3 or 4 years more life. Is it policy to do this? It would appear to be better to tear it down and build a new one.

Mr. Way: Perhaps it will clear up the situation if an amendment is made to the effect that, instead of accepting the rate of depreciation as worked out by the committee based on the data compiled, to let the present rate of depreciation stand, and refer the matter back to the committee for continued consideration as to the actual point of depreciation. I make that as an amendment to the motion.

The Chairman: It is not within our province to settle the rate of the value of the car under the present operation. The corporate interests value the car, and any rate change, one way or the other, can only be done with their consent. I would suggest that you keep that in mind when we undertake to make any change this year, and I want to say, that as chairman, that it is not my intention to allow any of these motions to be passed, if it is in my power to have them withdrawn.

In the first place, this matter will have to be referred to letter ballot to change any method of value of a scrapped car. We have always had two methods of depreciation, and the reason we have had these two methods, is because one covered a worn-out car, and the other covered a destroyed car, and we had the two methods to prevent the very thing Mr. Sillcox told us about—that many cars have been destroyed because they could be paid for more cheapely than they could be repaired.

I hope that some one will make a motion to take the place of these amendments, so that a proper vote can be taken with regard to the matter. We had better go on, in my opinion, as we are, for another year, and let the committee put further study to the subject.

It is wrong to think of limiting the life of a steel car to 17 years . I would say that 25 years is the life of a steel car, on the average. I think that 20 or 22 years is the life of a wooden car. Thirteen years is not anywhere nearly long enough for the life of a steel car, unless it has been abused and practically thrown away. I do not want to see anything passed that is wrong, and we had better accept what we have until we get something better, rather than adopt something we have not the authority to do.

Mr. Fuller: I approve of everything you have said, Mr. Chairman. I cannot afford, and I do not think there is anybody in this room who can afford, to vote on the period of 15 or 17 years as the life for a steel car. If Mr. Hennessey is the man who made this motion, I will ask him to withdraw it.

Mr. Hennessey: My only motion was to receive the report of the committee and open it for discussion. I have no motion before the house. Mr. Gaines has a motion pending.

Mr. Gaines: I will withdraw my motion.

Mr. Goodnow: As I seconded Mr. Way's amendment, I do not understand that it has anything in view except to change the rate of depreciation which is arbitrarily established by the M. C. B. rules. It does not change the time allowed for depreciation, but simply changes the rate from 5.3 to 4.3 per cent. That is perfectly safe. The only reason the question of the value of cars was brought up here was on account of the change attempted to be made in the rate, and if you make that change you must take into consideration the value of the cars. Mr. Way's amendment does not take into consideration the value of the cars at all, but simply takes into consideration the rate of depreciation.

Mr Gaines: I move that the report of the committee be received, and that the committee be continued for another year to take up all these questions which we have discussed; that we maintain the old rule which we have for the ensuing year, pending another report from the committee at next year's convention.

C. E. Spoor (B. & S.): I want to say that for the past month or two I have been making an inspection of the equipment on our roads, and I found that we could repair the cars at our home shops at less than $200 in two instances, and from these facts I do not believe the steel car equipment should be put below 20 years. I think it should be extended longer. I believe the committee should be continued.

F. W. Brazier (N. Y. C. Lines): We have had some steel cars on our lines that have gone to pieces in less than 12 years. It makes a big difference what service the cars are in. I ask Mr. Kleine what service the cars are in that have been on his road for 20 years—in coal service?

Mr. Kleine: Yes, the cars go to tidewrater daily.

Mr. Brazier: I believe the best car ever built, with steel underframe, will not survive the coal business.

Mr. Sillcox: One of the difficulties the committee was confronted with, and one of the matters which made it so confusing for the committee to arrive at a conclusion, was the fact that we labored with the question of depreciation without giving due consideration to the question of rebuilding. You cannot consider one without the other, because one takes in the question of repairs and of maintenance, and I think now that the opportunity has been given to give consideration to the rebuilding feature that the committee can work with a great deal more freedom. The fact remains that there has not been enough experienc had with the steel car to date in order to arrive at definite conclusions. It is a question of type of construction employed, whether of wood or steel, which enters into this question, and we must solve that feature before we can solve the general question.

There are classes of steel cars in service today not as good as wooden cars. There were a lot of general service cars built in 1912 to sell and not to give long service.

Chairman: The first steel cars operated on the Central Railroad of New Jersey were bought in 1901. These cars are still in service, with the original sides, most of them; new bottoms and hoppers in most cases, and they are good for eight or ten years more.

Mr Fuller: I would like to make a motion that the committee's report be received, so far as the 3 per cent. depreciation is concerned, and that the report then be returned to the committee for further consideration.

Prof. W. F. M. Goss: Before the question is put, I would like to say that we all fully understand that the depreciation which is discussed by the committee is really a depreciation of investment, not of a car, and I make that distinction because there are other uses of depreciation which we sometimes wish to employ, which would lead us to a different result from that which is reached by the committee. You are trying to determine the diminished value of your investment, of your car, and hence you credit your scrap values, but suppose I wish to determine the rate at which new cars are to be built, because of the losses through depreciation, then there is no scrap value that I can take into account, and I must work upon the basis of cars put out of service from depreciation, that is, through the using up of their life tenure.

The point I wish to make is, that in fixing the value for depreciation, as the committee has recommended, and as is contemplated by this motion, we are depreciating investment, and not cars.

The motion, that the committee's report be received so far as the 3 per cent depreciation is concerned, and that the report be returned to the committee for further consideration, was put to vote and unanimously carried.

Revision of Passenger Car Rules of Interchange

H. H. Harvey
Chairman

THE COMMITTEE on the Revision of Passenger Car Rules submits the following changes for consideration:

Sections A, B and C should be changed to conform with whatever changes the Arbitration Committee makes in Article II of the freight car rules.

Add a Section "D" to read as follows: "It will no longer be necessary to apportion among interested carriers the expense of heating, lighting, cleaning, etc., of passenger train equipment employed in through service over railroads under Federal control. A fair proportion of the expense should be charged against any non-Federal road which participates in the through service."

"NOTE.—Under Section 'D,' items per Rules 6 'C' and 'D,' 9 and 10, also other expenses chargeable to I. C. C. Account 402—Train Supplies and Expenses, shall not be billed for as between roads under Federal control, nor shall owners be billed for items mentioned in Rule 7 'C' when such items are chargeable to Account 402.

"Any Federal controlled road incurring any expense as above in connection with through service in which a non-Federal controlled road participates will bill direct against the latter for its fair proportion of expense. Any non-Federal controlled road incurring expense in connection with items mentioned in Rule 7 'C' will bill direct against car owner."

RULE 7. If the Wheel Committee makes provision for a change in Item 4, paragraph F (tread worn hollow), this rule should be changed to comply with their report.

RULE 8. If Freight Car Rule 32 is changed by the Arbitration Committee, paragraph "A" should be changed to correspond.

Add a paragraph at the end of Section "F" to read as follows: "The above provisions shall govern any loss or increase of service metal on account of the mate wheel, even if same is not defective, if both wheels are turned off to correspond."

RULE 9. Make the third line of paragraph "C" read "Mantles, tips, burners, domes, globes." Add a paragraph "E" to read as follows: "Illuminating oils, water and ice are not a line expense. Coal, wood and charcoal are not a line expense unless used as specified in paragraph 'B' for cars in line service. (See note below.)" Make paragraph (4) read as follows: "Coal, wood, charcoal, water and ice. (Such items furnished private or business cars shall be charged against the car owner.)"

RULE 13. The labor rate referred to in answer to the question in the interpretation should be changed to 68 cents, instead of 58 cents.

RULE 17. Omit the words "Not in line service" in the first line.

RULE 19. Add a sentence immediately after the third line to read as follows: "Original record of repairs and billing information shall be prepared as required in the freight car rules."

RULE 20. If the percentages in the freight car rules are changed, those mentioned in this rule should be changed to correspond.

RULE 21. Labor on repairs (Item 20) should be changed from 58 cents to 68 cents per hour.

RULE 22. Make a third note on page 204 to read as follows: "Material not listed above, but listed in Rule 101 of the freight car rules (if same as that used on freight cars), shall be charged at prices shown in Rule 101. All other material to be charged at net store department cost, except material ordered from car owner, which shall be handled in accordance with Rule 122 of the freight car rules."

The report is signed by H. H. Harvey (Chairman), Chicago, Burlington & Quincy; C. J. Nelson, Chicago & Northwestern; W. R. McMunn, New York Central; J. E. Mehan, Chicago, Milwaukee & St. Paul; T. J. Boring, Pennsylvania, and C. J. Forrester, Grand Trunk.

Discussion

A motion that the report be adopted was carried. The meeting then adjourned to 9.30 o'clock Thursday morning.

The Thursday Morning Session

The Thursday morning session was called to order at 9.40 by Chairman Chambers. It immediately proceeded to a consideration of committee reports.

Report of Committee on Car Wheels

W. C. A. Henry
Chairman

CERTAIN RECOMMENDATIONS have been made by manufacturers of wrought-steel wheels and referred to this committee. Among them is one, that the 38-in. diameter wrought-steel wheel be eliminated from our standards, it being stated that the number of wheels of this diameter manufactured is small and that in many cases the 36-in. wheel could be used. The committee does not have sufficient information to justify making definite recommendations at this time, but arrangements will be made to obtain this information, meanwhile the use of the 38-in. wheel should be discouraged.

It has been recommended that the limit of wear groove for wrought-steel wheels be located ½ in. from the inside of the rim of the wheel instead of ¾ in. as at present, it being that the thickness of metal would be sufficient to afford the necessary strength. Other questions than the strength of the wheel are involved, namely, maintenance of draw bar height, truck clearance, and effectiveness of brakes with increased range in diameter of wheels. The committee, therefore, requests that the members give this subject consideration in order to reply to a circular of inquiry that will be sent out.

The question has been raised as to whether the standard wheel circumference measure, sheet M. C. B.-16B, should have the points indicating the normal circumference of the 33-in. and 36-in. wheels located on the tape when laid out flat, or whether a correction should be made for the tape thickness; there being a difference of 3/10 in., or more than one tape size, depending upon which way the tape is laid off. In playing out the wheel circumference measure, due correction should be made for the tape thickness and in order that absolute uniformity may be obtained the Executive Committee has decided that the association obtain standard rings of 33-in. and 36-in. diameter; these rings to be certified by the Bureau of Standards and used in cases of dispute to check wheel tapes. The committee was instructed to prepare a design and mounting for these rings and they are submitted herewith (exhibit *A*).

The specifications for wrought-steel wheels permit a variation of five tape sizes under and nine tape sizes over the size called for. It is felt desirable to provide for these additional tape

ces for 33-in., 36-in. and 38-in. wheels by adding to the spaces now provided for taping cast-iron wheels. The continuous markings on the upper side of the tape would then be used for mating worn wheels. Exhibit *B* shows the recommendations of the committee as to how this could be carried out.

The following note should be inserted on sheet M. C. B.-16B: The linear dimensions shown represent measurements of the actual circumference of the wheel and not the straight length of the tape. Graduations are to be spaced ⅛ in. apart with the tape laid flat, and the space between lines 157 and 158 on the upper side of the tape is to coincide with the space representing tape size No. 3 for the 33-in. diameter cast-iron wheels.

Rule 76 of the Rules of Interchange reads as follows: "Tread worn hollow; if the tread is worn sufficiently hollow to render the flange or rim liable to breakage." It is the opinion of the committee that the meaning of this rule is not clear and subject to wide variation in actual application; it having been found that many wheels are being withdrawn on account of tread wear without the wear being sufficient to injure the wheel. The committee recommends that a gage, as shown in exhibit *C*, be used in determining whether or not a wheel should be condemned on account of tread worn hollow; a wheel not to be condemned on this account unless the projection on the underside of the gage does not come in contact with the tread of the wheel.

It has been recommended that a clause be inserted in our specifications, requiring that in case of cast-iron wheels failing to pass the M. C. B. test the first letter of the initials of the purchasing road be chipped off with the idea of stopping the practice claimed to exist to a certain extent of roads purchasing rejected wheels. It is felt that action of this sort is desirable, but that the letter *C* in the legend *M. C. B.* be chipped off for the reason that, being located on the outside of the wheel it can be more readily seen than if a letter on the inside, where the purchaser's name is placed, were chipped off. Furthermore, wheels not coming up to M. C. B. requirements cannot be considered M. C. B. wheels. The committee, therefore, recommends that the following clause be added to the specifications for cast-iron wheels under the heading "Rejection," paragraph 16: (d) In all cases where wheels are rejected the letter *C* must be chipped out of the legend *M. C. B.* on the outside face of each wheel. It is further recommended by the committee that a rule be inserted in the Rules of Interchange prohibiting acceptance, in interchange of a car, any of the wheels of which have the letter *C* chipped out of the legend *M. C. B.*

The Association of Manufacturers of Chilled Car Wheels advises that all information thus far available indicates the superiority of the arch design of plate adopted in 1917, for the 700 and 850 lb. wheels over what has been considered our standard design of plate. It is our feeling, however, that another year should be allowed to elapse in order to accumulate more information before considering the re-design of the 625 and 725 lb. wheels.

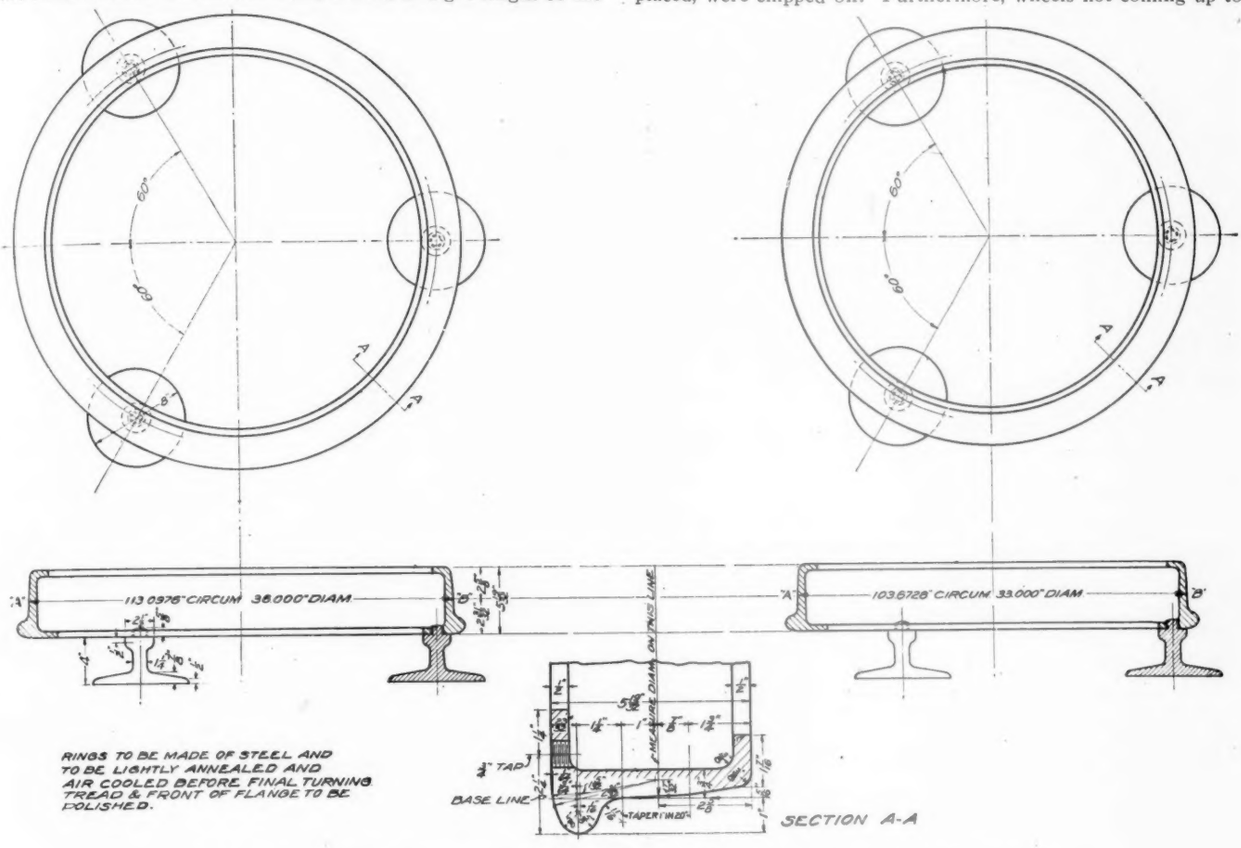


Exhibit A.—Wheel Circumference Measure Test Rings for 33-in. and 36-in. Wheels

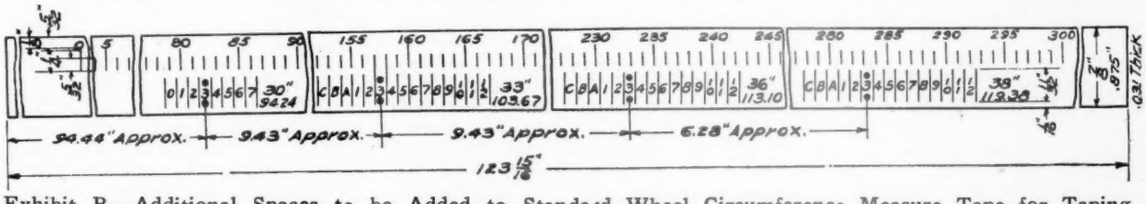


Exhibit B.—Additional Spaces to be Added to Standard Wheel Circumference Measure Tape for Taping Wrought Steel Wheels

The report is signed by W. C. A. Henry (Chairman), Pennsylvania Lines; E. J. Brennan, Chicago, Milwaukee & St. Paul; W. H. Winterrowd, Canadian Pacific; J. A. Pilcher, Norfolk

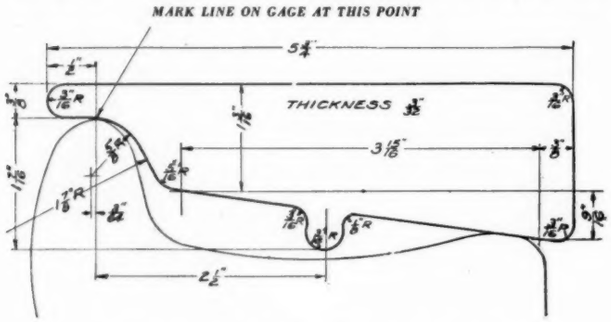


Exhibit C.—Wheel Tread Worn Hollow Gage

& Western; O. C. Cromwell, Baltimore & Ohio; J. M. Shackford, Delaware, Lackawanna & Western; H. E. Smith, United States Railroad Administration; C. T. Ripley, Atchison, Topeka & Santa Fe, and R. E. Jackson, Virginian.

Discussion

At the conclusion of the report, Mr. Henry said: The committee would like to supplement its report by recommending that we submit to letter ballot the following items:

1. The standard rings referred to in our report as exhibit A; 2, the modified wheel circumference measure referred to in our report as exhibit B; 3, the gage for determining tread wear referred to in our report as exhibit C; 4, the modification of the wheel specifications to require the letter *C* to be chipped from condemned wheels; 5, provide in the Rules of Interchange to prohibit accepting cars, any wheel of which has had the letter *C* chipped off.

A motion that the report be accepted and opened for discussion, and the questions suggested submitted to letter ballot was carried.

Mr. Gaines: Referring to the recommendation of the committee, relative to chipping off the letter "C." While I believe that is a good thing to do, I wonder if you won't throw a lot of work on our interchange inspectors to examine every wheel and see whether they have the "C" on them or not. I would like to hear from the committee whether they think they can carry that out or not. The principle is good.

Mr. Henry: It was not thought that that will place very much of a burden on the inspector. The wheels are supposed to be carefully looked after in interchange, and the fact that these letters are large and on the outside plate, should not place any appreciable amount of work on the inspectors.

Mr. Brazier: The idea is all right, but I would like to know how the inspector, with four or five inches of snow or ice on the wheels, will be able to see it. The inspector condemning the wheels having the "C" cut out is all right, but there may be some unprincipled people that will buy them and use them over again, and the idea of the committee is to overcome this by having the inspectors reject them. I can see how that would work in the summer, but it will be rather difficult in the winter, with snow and ice on the wheels.

Mr. Tollerton: I would like to ask the chairman of the committee, if he has any guarantee that the inspector will chip the "C" off the wheel. I think they will have car repairers do it, so that might involve the question of expense.

Mr. Henry: It was the idea that the letter "C" would be chipped from the wheels at the place of manufacture. Some roads now require one of the initials of their legend to be chipped off wheels which are manufactured for them, and which fail to pass the test. The removal of that letter should be done at the point of manufacture of the wheel and nowhere else.

Mr. Goodnow: I have just one question about the two items that go to letter ballot. Will that not be too late to get in the Rules of Interchange? The results of letter ballots are not generally known at the time the rules are printed in interchange. The items that go in the rules are usually passed by the vote of the floor here, rather than by letter ballot, so as to get them in in time.

Chairman: The Secretary informs me that they will be in all right, that our letter ballot goes out earlier than formerly. It will be included. If there are no other questions, we will declare the subject closed.

Standard Blocking for Cradles of Car Dumping Machines

J. McMullen
Chairman

THE COMMITTEE appointed to make recommendations covering standard blocking for cradles of car dumping machines has found by observation of the operation of the machines equipped with the present M. C. B. blocking that cars receive more or less damage while passing through the machines. The railroad mechanical department, with the co-operation of the heads of various industries in the coal and ore district, after experimenting with several types of blocking, developed what we consider the most suitable blocking for protecting the various types of cars now being handled on the car dumper.

This blocking consists of vertical posts covered with horizontal planking. This arrangement furnishes the greatest possible bearing surface for the side of the car, which is one of the most important requirements. The proposed blocking can be renewed at less expense than the old style, as it is only necessary to renew the planking at the places where it wears out, while with the present M. C. B. blocking it is necessary, in some cases, to renew the heavy vertical posts when they become worn.

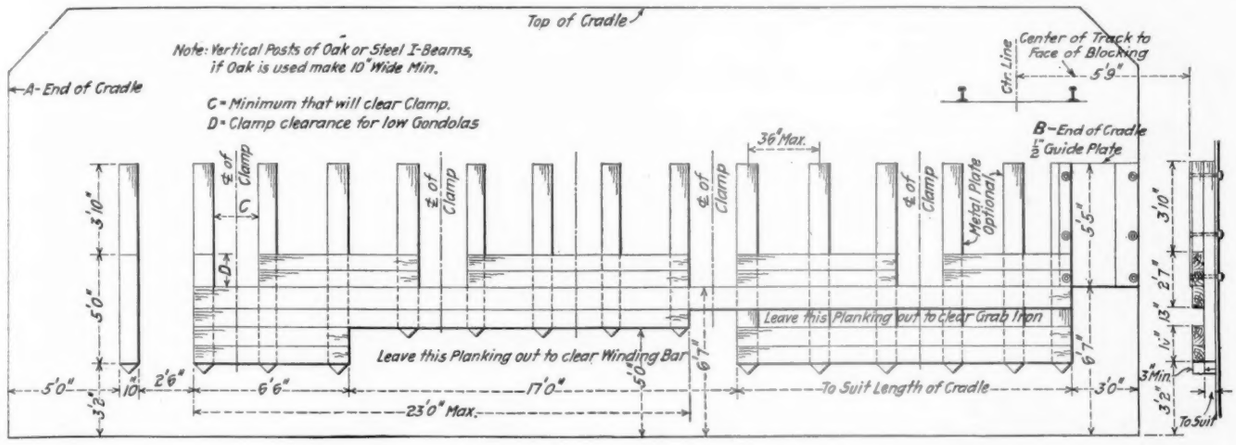
Provision is made to take care of projecting grabirons, ladders and the ends of winding bars by omitting a part of the 3-in. planking at the *B* end and near the center of the cradle wall. The planking is also omitted between the first and second posts at the *A* end of the machine so that short cars may be handled nearer the center of the cradle, this to be accomplished by spotting the car with the side ladder between the two posts. The long cars are to be spotted with the ladder outside of the end post. This post is to be faced with 3-in. timber to make the face flush with the planking. Railroads operating cars having the top side angle projecting beyond the face of the car side may cut a horizontal recess 6 in. wide and 3 in. deep in the face of the blocking at the point of contact with the angle.

The matter of applying a metal plate to the face of the posts above the planking to prevent wear of the facing on the posts is left optional with the company operating the machine. All fastenings, such as bolts, lags, spikes, etc., shall have heads flush or below the face of the blocking. The distance from the center of the track to the face of the planking should be made 5 ft. 9 in. (where possible) when the cradle is in the normal position. A guide plate should be located as shown on the drawing at the *B* end of the cradle to prevent damage to the blocking by cars having sides bulged too wide to clear.

The planking directly under the clamps should not extend more than 6 ft. 7 in. above the top of the rail in order that the clamp may drop low enough to engage the top of low side cars. The spacing of the vertical posts will have to be governed to some extent by the construction of the cradle, but they should not be spaced further apart than 3 ft. centers where possible, with the exception of the first two at the *A* end, which should be spaced not less than 2 ft. 6 in. between the posts, as shown on the drawing. The bottom ends of the posts should be tapered

to prevent material falling onto the cradle from lodging against them when the cradle is overturned. Oak lumber is recommended for the planking on the face of the posts.

The report is signed by Jas. McMullen (Chairman), Erie; J. W. Senger, New York Central; J. J. Tatum, United States Railroad Administration; George Durham, Wheeling & Lake Erie; T. W. Demarest, Pennsylvania Lines; J. E. Davis, Hocking Valley; G. M. Gray, Bessemer & Lake Erie, and J. A. Pilcher, Norfolk & Western.



Blocking Suggested for Protecting Cars on Car Dumping Machines

Discussion

F. W. Brazier: This committee has gone to a great deal of trouble in compiling this report, and it seems that some of the men who handle the machines ought to make some statement concerning them. Our road does not handle them, but I think when a committee has worked as hard as this committee, and has presented such a report, that some one should say whether the report is right or wrong, and in that way encourage the committee.

George W. Rink (C. R. of N. J.): I would like to have an interpretation of what is meant by the "A" end of the cradle and the "B" end of the cradle; does "A" end signify the approaching end, that is, the end in which the car is delivered, because the lay-out of the blocking has a bearing on which end you are going to work from?

James McMullen: The "B" end of the cradle is the approaching end. In the case of the "A" end of the cradle, you will note the first post is five feet from the end of the cradle. This is so arranged in order to clear the ladder from the end of the coupler to the inside of the ladder, and for that purpose we leave that five feet, and consider that will take care of long cars.

Many of the people operating these machines do not like to have all of the cars dumped, long and short cars, at one end of the machine, they said they wanted to get the short cars nearer to the center, and therefore we leave a space of 2 ft. 6 in. between the first and second posts, so that the short cars could be located nearer the center, and allow the ladder to drop into this recess between the first and second posts.

F. F. Gaines (U. S. R. A.): Is it the intention of the committee that the report shall be submitted as recommended practice, or shall be adopted as a standard? I think we should have a definite recommendation from the committee as to what is to be done with the report.

James McMullen: We have submitted this report in the form of a statement of general information on the subject, and placed it before the association. The report may be adopted as recommended practice, and tried out for a while, although the methods which are described in the paper have been in service for some time in the Youngstown district.

Mr. Tatum: I would suggest that this report be made recommended practice, because there is constant changing in the design of equipment in the way of capacity. In the Pennsylvania cars which are on exhibition here there is some difference in the lay-out, and it may be necessary to make other changes. If the report is approved and adopted as recommended practice it would be better than to adopt it as a standard.

T. W. Demarest (Pennsylvania Lines): The question of proper blocking on coal-dumping machines is a more serious and important proposition than you may realize. The railroads operating along the lakes and throughout the steel territories come in contact with coal and ore-dumping machines. Cars are run on the cradle, the cradle is lifted and clamps thrown over the cars, and the cars turned upside down. In the operation of dumping the car lies on its side, and unless the side of the car is properly supported at the time it is being dumped there is a great deal of damage done to it. That includes not only the side of the equipment, but perhaps safety appliances and other attachments on the sides of the car.

Some four or five years ago the Erie, the Baltimore & Ohio, and the Pennsylvania tried to get together with a view of having the dumping machines at the mills and the docks blocked in a standard manner. The blocking used on machines was all different, and the result was that while one machine was properly blocked, others were so blocked that cars were being badly damaged.

The basis for the recommendations made by this committee is the blocking which was worked out experimentally and has been in service on some of the machines for over three years. This method has been so arranged as to avoid, as far as possible, damaging the car, and in severe cases it will almost straighten up the side of the car.

The association ought to receive this report, and the matter should be submitted to letter ballot with a view to adopting it as recommended practice. It is a very important item.

Samuel Lynn (P. & L. E.): I concur in what Mr. Demarest said. For several years we have had more or less trouble in the Pittsburgh district, on account of the dumping machines. The committee has worked up a very good report and a method to protect our cars when they are going over the machines.

J. J. Ewing (C. & O.): I would like to ask an explanation of this guide plate. I don't quite understand the construction of it.

Mr. McMullen: The guide plate is to be applied at the "B" end of the machine, bevelled off to guide wide cars into the machine, so that they won't damage the end of the planking when entering. Perhaps it would have been well if we had shown a detailed sketch of this guide plate. However, we can arrange to have that shown so that it will appear in the proceedings.

Mr. Rink: We happen to be unfortunate, I presume, in just getting two McMyler machines in operation, to find that the blocking does not check with this proposition. They have installed a square section of blocking, and I am wondering whether it could be changed to this type without any great expense, if we should find that the square type arrangement will not prove satisfactory.

Mr. McMullen: I believe it can be changed to come pretty

close to this lay-out. It will wear out in a short time, so that you will have to renew it anyhow.

Mr. Rink: The present installation is a large square block, setting lengthwise, with a heavy angle iron frame, and we would have to make some changes to the frame before we could apply two thicknesses of material.

Mr. McMullen: I think that perhaps your blocking is heavy enough there, so that you could reduce the posts sufficiently to compensate for the horizontal planking that would be applied on the face of the posts.

A motion that the report be submitted to letter ballot for recommended practice was carried.

Specifications and Tests for Materials (M. C. B.)

F. M. Waring
Chairman

THE COMMITTEE SUBMITS its report covering the subjects which were reviewed during the past year and recommends that changes be made in the several specifications, as shown under the respective exhibits. All references to page numbers relate to the 1918 Proceedings.

Exhibit A

1. The following revision to supercede the present Specifications for Galvanized Sheets for Passenger and Freight Equipment Cars, page 1042, as Standard.

Specifications for Galvanized Sheets for Passenger and Freight Equipment Cars.

(Standard)

1. **Scope.**—These specifications cover galvanized steel and iron sheets for use on passenger and freight equipment cars.

I. MANUFACTURE.

2. **Process.**—(a) The sheet material may be either open-hearth mild steel, or puddled iron made wholly from pig iron.

(b) All sheets shall be thoroughly cleaned and then galvanized with a coating of not less than 1.5 oz. of zinc per square foot.

II. PHYSICAL PROPERTIES AND TESTS.

3. **Bend Tests.**—(a) A test specimen shall stand bending double on itself around a mandrel, the diameter of which is equal to twice the thickness of the specimen, and straighten, without cracking or flaking of the coating on either side of the specimen.

(b) A test specimen shall bend twice in the same direction, first around a mandrel the diameter of which is equal to fifteen times the thickness of the specimen, and straighten, and then bend flat on itself and straighten, without cracking of the base material.

(c) Sheets of Gage No. 26 and less in thickness shall double-lock seam without cracking of the sheet or coating.

4. **Test Specimens.**—Specimens eight inches in length by two inches in width shall be cut from the center of a sheet selected at random from each lot of 1,000 sheets or fraction thereof, for test purposes.

III. PERMISSIBLE VARIATIONS IN WEIGHT.

5. **Permissible Variations.**—The weight of the finished sheets shall not vary more than 2½ per cent either way from that shown in Table 1.

TABLE 1.
WEIGHT OF GALVANIZED SHEETS.

United States Standard Gage Number.	Weight Per Square Foot, Oz.
16	42.5
17	38.5
18	34.5
19	30.5
20	26.5
21	24.5
22	22.5
23	20.5
24	18.5
25	16.5
26	14.5
27	13.5
28	12.5
29	11.5
30	10.5

IV. WORKMANSHIP AND FINISH.

6. **Workmanship.**—The sheets shall conform to the gage and size ordered.

7. **Finish.**—The finished sheets shall be properly galvanized, be free from blackened and acid spots and surface defects.

V. MARKING.

8. **Marking.**—The finished sheets shall, when ready for shipment, be properly marked with the name or brand of the manufacturer and a lot number for identification.

VI. INSPECTION AND REJECTION.

9. **Inspection.**—(Same as paragraph 7 of 1918 specifications.)

10. **Rejection.**—(a) Sheets represented by samples which fail to conform to the requirements of these specifications will be rejected.

(b) Sheets which, subsequent to tests and inspection at the mills or elsewhere and their acceptance, show black spots, inferior galvanizing, improper trimming or other defects will be rejected and shall be replaced by the manufacturer.

11. **Rehearing.**—Samples tested in accordance with Section 9 (b), which represent rejected material, shall be preserved for two weeks from the date of the test report. In case of dissatisfaction with results of tests, the manufacturer may make claim for a rehearing within that time.

Exhibit B.

2. The following revision to supersede the present Specifications for Miscellaneous Steel Castings for Passenger and Freight Equipment Cars (Recommended Practice), Specifications for Cast-Steel Truck Sides (Recommended Practice) and Specifications for Cast-Steel Bolsters (Recommended Practice), pages 1029, 499 and 502, respectively.

Specifications for Annealed Carbon Steel Castings for Passenger and Freight Equipment Cars.

(Recommended Practice)

1. **Scope.**—These specifications cover all steel castings for passenger and freight equipment cars, including couplers, truck bolsters, truck side frames, yokes and miscellaneous castings.

I. MANUFACTURE.

2. **Process.**—The steel may be made by the open-hearth, crucible or electric process.

3. **Heat Treatment.**—Castings shall be allowed to become cold They shall then be uniformly reheated to the proper temperature to refine the grain and allowed to cool uniformly and slowly. If, in the opinion of the purchaser or his representative, a casting is not properly annealed, he may at his option require the casting to be re-annealed.

II. CHEMICAL PROPERTIES AND TESTS.

4. **Chemical Composition.**—The steel shall conform to the following requirements as to chemical composition:

Carbon	0.20–0.37 per cent.
Manganese	not over 0.75 per cent.
Phosphorus	not over 0.05 per cent.
Sulphur	not over 0.05 per cent.

5. **Ladle Analyses.**—An analysis of each melt of steel shall be made by the manufacturer to deter mine the percentage of carbon, manganese, phosphorus and sulphur. This analysis shall be made from drillings taken at least ¼ in. beneath the surface of a test ingot obtained during the pouring of the melt. The chemical composition thus determined shall be reported to the purchaser or his representative, and shall conform to the requirements specified in Section 4.

6. **Check Analyses.**—A check analysis may be made by the purchaser from the broken tension test specimen or from a

finished casting representing each melt. The chemical composition thus determined shall conform to the requirements specified in Section 4. Drillings for analysis shall be taken not less than ¼ in. beneath the surface of the casting.

III. Physical Properties and Tests.

7. **Tension Tests.**—(a) The steel shall conform to the following minimum requirements as to tensile properties:

Tensile strength, lb. per sq. in.	65,000
Elastic limit, lb. per sq. in.	0.4 Tensile Strength
Yield point, lb. per sq. in.	0.45 Tensile Strength
Elongation in 2 in., per cent.	1,600,000
Reduction of area, per cent.	$\frac{\text{Tensile Strength}}{35}$ Not under 22 per cent.

(b) Either the elastic limit or the yield point, but not both, shall be determined. The elastic limit shall be determined by an extensometer and the yield point by the drop of the beam of the testing machine.

(c) The yield point, or the elastic limit, shall be determined at a cross-head speed not to exceed ⅛ in. per minute, and tensile strength at a speed not exceeding 1½ in. per minute.

8. **Alternative Tests to Destruction.**—In the case of orders including only castings not exceedings 150 lb. in weight, a test to destruction on one casting for each 100 castings or smaller lot may be substituted for the tension tests. This test shall show the material to be ductile, free from injurious defects, and suitable for the purpose intended.

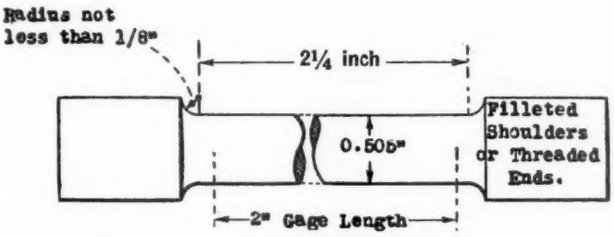


Fig. 1.—Exhibit B, Paragraph 8

9. **Test Specimens.**—(a) Tension test specimens shall conform to the dimensions shown in Fig 1. The ends shall be not less than ⅞ in. in diameter and of a length and form to fit the holders of the test machine in such a manner that the load will be axial.

(b) An adequate number of test coupons shall be cast with and attached to castings, weighing over 150 lb., from each melt when presented for inspection. If the design of the casting is such that the test coupons cannot be attached, the test bars shall be cast in runners outside of the casting, but attached to it to represent each melt. The location of the test coupons or bars, as well as the method of casting such coupons or bars, shall be subject to mutual agreement by the inspector and manufacturer. In the case of any orders for castings weighing under 150 lb., the physical properties as required in Section 7 may be determined from an extra or spare test bar cast with and attached to some other casting from the same melt.

(c) When sufficient coupons have not been cast, a test specimen may be cut from a finished casting at a location mutually agreed upon by the inspector and manufacturer.

10. **Annealing Lugs.**—For the purpose of determining the quality of annealing, at least two and not more than four annealing lugs shall be cast on all castings 150 lb. and over, and on such castings less than 150 lb. as required by the purchaser. The location of the annealing lugs shall be agreed on by the inspector and the manufacturer. The standard annealing lug shall be 1 in. in height and 1 in. in width by ⅝ in. in thickness where it joins the casting. The inspector may remove one-half and the manufacturer one-half of the number of annealing lugs.

11. **Grouping Melts.**—(a) After 15 consecutive melts, which may contain any or all classes of castings covered by these specifications on one or more orders, have been tested and accepted, the manufacturer may group the succeeding melts in lots of five melts each, but each lot not to exceed 40 tons; the entire group to be accepted if the test specimen selected from the lot fulfills the chemical and physical requirements herein specified. If this test fails, a rehearing will be granted on the melt that the failed bar represents, and the other four melts of the group shall be tested individually.

(b) In case of small orders for bolsters, truck sides, draft arms, yokes or castings weighing over 150 lb., where the size of order and the available pattern and foundry equipment are such that not more than five castings can be cast in any one melt, the physical properties as required in Section 7 may be determined from an extra or spare test coupon cast with and attached to some other casting from the same melt.

(c) If there is a period of more than six months between shipments of the class of castings covered by these specifications, then each melt shall be tested individually until 15 consecutive melts have been accepted, after which the melts may again be grouped as in paragraph (a).

(d) If one or more melts are rejected each succeeding melt shall be tested individually until 15 consecutive melts have been accepted, after which melts may again be grouped as in paragraph (a).

12. **Number of Tests.**—(a) One tension test shall be made from each melt, except as provided in Section II (a).

(b) If any test specimen shows defective machining or develops flaws, it may be discarded and another specimen substituted.

(c) If the percentage of elongation of any tension test specimen is less than that specified in Section 7 (a) and any part of the fracture is more than ¾ in. from the center of the gage length, as indicated by scribe scratches marked on the specimen before testing, a retest shall be allowed.

IV. Permissible Variations.

13. **Dimensions.**—The dimensions shall conform to the permissible variations shown on the drawings.

14. **Weight.**—The normal weight of the castings of any one design shall be determined from the actual weight of at least 50 castings weighed at one time. The weight of individual castings shall not vary more than 5 per cent over or 3 per cent under the normal average weight so obtained. The gross weight of the entire order of castings to be not more than 2½ per cent over the normal average weight multiplied by the number of castings in the order. The gross weight as specified herein shall apply only on large orders of castings from machine patterns.

V. Workmanship and Finish.

15. **Workmanship.**—All castings shall substantially conform to the size and shape shown on standard drawings, and shall be made in a workmanlike manner.

16. **Patterns.**—When patterns are furnished by the purchaser, the manufacturer shall make sure that the allowance for shrinkage in these patterns agrees with his own practice, and castings shall be rejected which do not conform closely to dimensions on prints, or if distorted by improperly matched flasks, undue rapping or any other defect caused by molding. Special attention should be given to properly rounding all fillets and corners shown on drawings. Where surfaces are to be machined, the castings shall have the proper allowance for finish. Under no circumstances shall manufacturer change purchaser's patterns, without written permission from the purchaser.

17. **Finish.**—(a) The castings shall be free from all injurious defects. Castings shall not be painted before inspection. Castings rusted to any extent, or covered with any material to hide defects, shall be rejected.

(b) Any casting found with blow holes, cracks, low spots or thin sections filled with cement or like material will be rejected and shall not be further considered. Welding will not be permitted unless authorized by the inspector and then only when the defects are cleaned to solid metal and only at locations where the defects will not in any way be detrimental to the strength of the casting.

VI. Marking.

18. **Marking.**—The manufacturer's name or identification mark and the specified pattern number shall be cast on all castings. In addition, the month and year when made shall be cast on all bolsters, truck sides and similar castings. The location and size of numbers shall be agreed upon by the manufacturer and the inspector. In accordance with the standard practice of the individual foundry, to identify individual castings, a serial number may be cast or the melt number may

be stamped on bolsters, truck sides and similar castings as agreed upon by the manufacturer and the inspector.

VII. Inspection and Rejection.

19. **Inspection.**—The inspector representing the purchaser shall have free entry, at all times while work on the contract of the purchaser is being performed, to all parts of the manufacturer's works which concern the manufacture of castings ordered. The manufacturer shall afford the inspector, free of cost, all reasonable facilities to satisfy him that the castings are being furnished in accordance with these specifications. All tests (except check analyses) and inspection shall be made at the place of manufacture prior to shipment, unless otherwise specified.

20. **Rejection.**—(a) Unless otherwise specified, any rejection based on tests made in accordance with Section 6 shall be reported within five working days from the receipt of samples.

(b) Castings which show injurious defects subsequent to their acceptance at the manufacturer's works will be rejected, and the manufacturer shall be notified.

21. **Rehearing.**—Samples tested in accordance with Section 6, which represent rejected castings, shall be preserved for two weeks from the date of test report. In case of dissatisfaction with the results of the tests, the manufacturer may make claim for a rehearing within that time.

Exhibit C.

3. The following revision to supersede the present Specifications for Rivet Steel and Rivets for Passenger and Freight Equipment Cars (Standard), page 1038:

Specifications for Rivet Steel and Rivets for Passenger and Freight Equipment Cars.

(Standard.)

1. **Scope.**—These specifications cover steel bars for the manufacture of rivets and finished steel rivets for passenger and freight equipment cars.

I. Manufacture.

2. **Process.**—The steel sall be made by the open-hearth process.

II. Chemical Properties and Tests.

3. **Chemical Composition.**—The steel shall conform to the following requirements as to cheimcal composition:

Carbon	perceneage optional.
Manganese	percentage optional.
Phosphorus	not over 0.04 per cent.
Sulphur	not over 0.05 per cent.

4. **Ladle Analyses.**—An analysis of each melt of steel shall be made by the manufacturer to determine the percentages of carbon, manganese, phosphorus and sulphur. This analysis shall be made from a test ingot taken during the pouring of the melt. The chemical composition thus determined shall be reported to the purchaser or his representative, and shall conform to the requirements specified in Section 3.

5. **Check Analyses.**—An analysis may be made by the purchaser from finished bars or rivets representing each melt. The chemical composition thus determined shall conform to the requirements specified in Section 3.

III. Physical Properties and Tests.

A.—Requirements for Bars.

6. **Tension Tests.**—The bars shall conform to the following requirements as to tensile properties:

Tensile strength, lb. per sq. in.	45,000—60,000
Elongation in 8 in., min. per cent.	1,500,000
	Tensile Strength
	but need not exceed 30 per cent.

7. **Bend Tests.**—The test specimen shall bend cold through 180 degrees flat on itself without cracking on the outside of the bent portion.

B.—Requirements for Rivets.

8. **Bend Tests.**—The rivet shank shall bend cold through 180 degrees flat on itself, as shown in Fig. 1, without cracking on the outside of the bent portion.

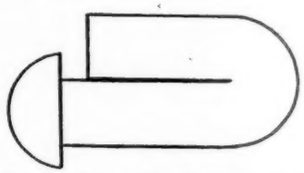


Fig. 1.—Rivet Shank Bent Cold

9. **Flattening Tests.**—Rivet heads shall be flattened sideways, when cold, to a thickness of one-third, and when at a driving heat to a thickness of one-fourth the original diameter of the shank without splitting.

10. **Test Specimens.**—(a) Bars.—Tension and bent test specimens shall be of the full section of bars as rolled.

(b) **Rivets.**—Bend and flattening test specimens shall be of the full section of rivets as manufactured.

((c) When accurate account of the material has been kept and the melts can be identified, only one set of specimens for each diameter in each melt shall be taken from either the bars or the finished rivets.

11. **Number of Tests.**—(a) Bars.—One tension and one bend test shall be made from each lot of 200 bars, or from each diameter in any one melt, each of which shall conform to the requirements specified.

(b) **Rivets.**—One bend and one flattening test shall be made from each lot of 100 kegs of each diameter or from each diameter in any one melt, each of which shall conform to the requirements specified.

(c) If any test specimen from the bar or rivets originally selected to represent a lot of bars or rivets contain surface defects not visible before testing, but visible after testing, or if a tension test specimen breaks outside the middle third of the gage length, one retest shall be allowed.

IV. Permissible Variations in Gage.

12. **Permissible Variations.**—The bars shall conform to the M. C. B. standard limit gages.

13. **Dimensions of Rivet Heads.**—(Same as paragraph 19 of 1918 specifications.

V. Workmanship and Finish.

14. **Workmanship.**—The finished base shall be circular within 0.01 in., and the rivets shall be concentric, true to form and shall be made in a workmanlike manner.

15. **Finish.**—The finished bars and rivets shall be free from injurious defects and shall have a workmanlike finish.

VI. Marking.

16. **Marking.**—(a) Bars.—Rivet bars shall, when ready for shipment, be properly separated and marked with the name or brand of the manufacturer and the melt or lot number for identification.

(b) Rivets.—Kegs of finished rivets shall, when ready for shipment, be properly marked with the name or brand of the manufacturer, diameter of rivets and the melt or lot number for identification.

(c) Samples.—The melt or lot number shall be legibly stamped on each test specimen representing a lot of bars. Samples representing a lot of rivets shall be marked in a manner that will not impair their value for test purposes.

VII. Inspection and Rejection.

17. **Inspection.**—The inspector representing the purchaser shall have free entry, at all times while work on the contract of the purchaser is being performed, to all parts of the manufacturer's works which concern the manufacture of the bars or rivets ordered. The manufacturer shall afford the inspector, free of cost, all reasonable facilities to satisfy him that the bars or rivets are being furnished in accordance with these specifications. All tests (except check analyses) and inspection shall be made at the place of manufacture prior to shipment, unless otherwise

specified, and shall be so conducted as not to interfere unnecessarily with the operation of the works.

18. **Rejection.**—(a) Unless otherwise specified, any rejection based on tests made in accordance with Section 5 shall be reported within five working days from the receipt of samples.

(b) Bars or rivets which show injurious defects subsequent to their acceptance at the manufacturer's works will be rejected, and the manufacturer shall be notified.

19. **Rehearing.**—Samples tested in accordance with Section 5, which represent rejected bars or rivets, shall be preserved for two weeks from the date of the test report. In case of dissatisfaction with the results of the tests, the manufacturer may make claim for a rehearing within that time.

Exhibit D.

4. The following revision to supersede Specifications for Black Paint (Recommended Practice), page 1058:

Specifications for Black Paint.

(Recommended Practice.)

1. **Scope.**—These specifications cover carbon black semi-paste to be used as a protective paint for M. C. B. equipment cars.

I. Chemical Properties and Tests.

2. **Chemical Composition.**—(a) Paste.—The paste shall conform to the following requirements:

Pigment	43 to 47 per cent by weight.
Linseed oil	53 to 57 per cent by weight.

(b) Pigment.—The pigment shall conform to the following requirements:

* Lampblack or carbon black	not less than 30 per cent.
Red lead	not less than 8 per cent.
China clay or other approved inert pigment	not more than 62 per cent.
Oxide of iron, if present	not over 15 per cent., and may be substituted for an equal amount of lampblack.

* The lampblack shall be of a good quality and of such a character as to produce the standard shade. Ground coal, etc., will not be considered.

(The last paragraph under (b) together with paragraph (c) and article 3 to remain the same as in the 1918 specification.)

II. Physical Properties and Tests.

4. **Shade.**—(Same as in 1918 specifications.)

5. **Fineness.**—The pigment shall be ground so fine that it will not show any appreciable settling in the barrel, and, when a sample of the paste is washed on a 350-mesh sieve with a suitable solvent, at least 97 per cent of the pigment shall pass through the sieve. There shall be no visibly coarse particles in the residue on the 350-mesh sieve and shall pass through a 200-mesh sieve.

6. **Sampling.**—A sample of the paste shall be taken at random from any barrel, can or package in each shipment, at destination.

7. **Place of Making Tests.**—The purchaser may make the tests to govern the acceptance or rejection of the material in his own laboratory or elsewhere. Such tests shall be made at the expense of the purchaser.

III. Permissable Variations.

8. **Weight.**—As quotations are made by the pound on the basis of the paint weighing not over 10.5 lb. per gallon, all paint received which weighs more than 10.5 lb. per gallon, but not over 11.5 lb. per gallon, will be accepted at the weight of 10.5 lb. per gallon, the excess weight being at the expense of the manufacturer.

(Sections IV., and V., remain the same as in the 1918 specications.)

Exhibit E.

5. The following revision to supersede Specifications for Malleable Castings for Passenger and Freight Equipment Cars (Recommended Practice), page 1027:

Specifications for Malleable Iron Castings.

(Recommended Practice.)

1. **Scope.**—These specifications cover all malleable iron castings for freight and passenger equipment cars.

I. Manufacture.

2. **Process.**—The castings shall be made by either the air furnace, open-hearth, or electric furnace process.

II. Physical Properties and Tests.

3. **Tension Tests.**—The tension test specimens shall conform to the following minimum requirements as to tensile properties:

Tensile strength, lb. per sq. in.	45,000
Elongation in 2 in., per cent.	7.5

4. **Annealing Tests.**—(a) All castings, if of sufficient size, shall have cast thereon test lugs of a size proportional to the thickness of the casting, but not exceeding ⅝ in. by ¾ in. cross-section. On castings which are 24 in. or over in length, a test lug shall be cast near each end. These test lugs shall be attached to the casting at such a point that they will not interfere with the assembling of the castings, and may be broken off by the inspector.

(b) If the purchaser or his representative so desires, a casting may be tested to destruction. Such a casting shall show good, tough malleable iron.

5. **Test Specimens.**—(a) Tension test specimens shall be of the form and dimensions shown in Fig. 1. Specimens in which the mean diameter at the smallest section is less than 19/32 in. will not be accepted for test.

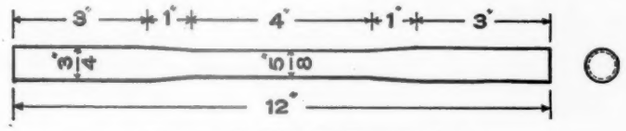


Fig. 1.—Exhibit E, Paragraph 5

(b) A set of three tension test specimens shall be cast from each melt, without chills, using heavy risers of sufficient height to secure sound bars. The specimens shall be suitably marked for identification with the melt. Each set of specimens so cast shall be placed in an oven containing castings to be annealed.

6. **Number of Tests.**—(a) After annealing, three tension test specimens shall be selected by the inspector as representing castings in the oven from which these specimens are taken.

(b) If the first specimen conforms to the specified requirements, or if, in case of failure of the first specimen, the second and third specimens conform to the requirements, the castings in that oven shall be accepted, except that castings will not be accepted if the test lugs show that they have not been properly annealed. If either the second or third specimens fail to conform to the requirements, the entire contents of that oven shall be rejected.

7. **Re-Annealing.**—Any castings that have shown insufficient annealing may be re-annealed, but not more than once. If the remaining test lugs, or castings broken as specimens, show the castings to be thoroughly annealed, they shall be accepted; if not, they shall be finally rejected.

III. Workmanship and Finish.

8. **Workmanship.**—The castings shall conform substantially to the patterns or drawings furnished by the purchaser, and also to gages which may be specified in any individual cases. The castings shall be made in a workmanlike manner. A variation of ⅛ in. per ft. will be permitted.

9. **Finish.**—The castings shall be free from injurious defects.

IV. Marking.

10. **Marking.**—The manufacturer's identification mark and the pattern numbers assigned by the purchaser shall be cast on all castings of sufficient size. Markings shall be applied at such a point that they will not interfere with the service of the castings.

(Section V., remains the same as in the 1918 specifications.)

The report is signed by F. M. Waring (Chairman), Pennsylvania; J. R. Onderdonk, Baltimore & Ohio; J. J. Burch, Norfolk & Western; I. S. Downing, Cleveland, Cincinnati, Chicago & St. Louis; Frank Zeleny, Chicago, Burlington & Quincy; A. H. Fetters, Union Pacific; H. B. MacFarland, Atchison, Topeka & Santa Fe; H. G. Burnham, Northern Pacific; H. E. Smith, United States Railroad Adminstration, and J. C. Ramage, Southern.

Discussion

After presenting the report Mr. Waring said: In addition the committee wishes to offer an amendment to the report,

which is not covered in the printed circular; this amendment to cover a modification of the specifications for steel axles, standard, page 483 of the 1918 Proceedings, Section 7; from the tests omit the letter "a" at the beginning of first paragraph and omit the entire paragraph "B." Paragraph "B" covers the selection of the test sample for chemical analysis and requires that a six-in. piece shall be cut off the axle and the test analysis be taken from this six-in. piece. The majority of the purchasers seem to be making their inspection and tests, by drilling directly from the end of the axle, instead of cutting off a six-in. test piece.

The committee felt it would be well to substitute that method of taking the chemical analysis sample. The chemical analysis clause would then read as follows: "An analysis shall be made by the purchaser from one axle representing each melt. The chemical composition thus determined shall conform to the requirements specified in Section 2. The drilling for this analysis shall be taken, with a five-in. drill, from one end of the test axle at any point midway between the center and surface."

A motion to amend the report by including the modification to the Specifications for Steel Axles was carried, and Mr. Waring then read exhibit "B" of the printed report.

Mr. Waring: This recommendation was made as a result of a meeting of the committee held in Chicago in April, at which time it was decided that the advance that had been made in the art of making steel castings was sufficient to justify us in recommending to the association a complete revision of the steel castings specifications, raising the physical properties from a test strength of 60,000 to 65,000 lb. per sq. in., and making a complete revision of the remainder of the specifications to cover certain details of inspections and tests.

Chairman: Mr. Waring, may I ask you if in each instance where you have made these changes that you give for the benefit of the members the reason that brought about the changes.

Mr. Waring: Our specifications for steel castings are rather old, and they are in accordance with what has been used for a great number of years. They do not recognize the fact that a great improvement has been made in the quality of steel castings, and we found that the castings we were actually getting showed physical properties greatly in excess of those required by the specifications. At the same time it was recognized that the grade of steel called for by the specifications might be entirely satisfactory in certain miscellaneous castings, which were not subjected to any great stress, or did not form part of any important structure, but in considering castings, such as truck sides and bolsters, many felt that since the design of these parts were required to stand stresses as high as 12,500 lb. per sq. in., and in some cases greater, that it would be well to provide designs with specifications covering material which would be amply safe for such stresses. I have to make some explanation as I go along, because the committee's action was not unanimous, and we will get down to something a little bit different at the end.

Subsequent to a meeting, at which nine members were present, and all of them voting in favor of the specifications, there was apparently a change of opinion among certain members, thinking that this recommendation for a complete revision of the specifications and increase in physical properties was perhaps a little bit too radical to present to the convention at this time. As a result of conversation among some of the members of the committee, it was suggested that the committee's report on steel castings specifications be offered at this time simply as a part of the report, and not to go to letter ballot. On that proposition the committee was divided, two being opposed, desiring that the specifications should be submitted as they stand, or withdrawn completely, and the remainder of the committee in favor of sending them as information only. I do not have any unanimous recommendation from my committee in regard to the specifications. It seems to me there are two things we can do: one of them taking the majority vote of the committee to present these specifications as information only as part of the report, but not to go to letter ballot for recommended practice; and the other that the specifications be withdrawn and referred back to the committee for further action. I would move that the revised specifications for steel castings, as presented in exhibit B of this report, be included in the report of the committee as information only.

H. G. MacFarland (A. T. & S. F.): I voted against that proposition of having it for information only. I really could not see what is to be gained by the presentation of the specifications after deliberation on the part of the committee for two years for information only. We have prepared a specification that meets very satisfactorily the requirements furnished by the steel companies except for a small percentage of rejections, and we think they will be very satisfactory, showing a tensile strength of 65,000 lb., a reduction of area of 35 per cent and a minimum ductility of 22 per cent. Those most essential requirements can easily be met and will provide a steel exceptionally satisfactory. I would much prefer that this go to letter ballot and be determined by the association, rather than left for information only, or if the association feels that it does not want a letter ballot, return it to the committee until we have a unanimous opinion. We did have a unanimous opinion at one time and I do not see any good reason why we should not continue with the same unanimity that we had expressed at one meeting.

Mr. Gaines: I would like to ask the chairman of the committee, what is the attitude of the steel makers themselves in regard to the question.

Mr. Waring: We have heard from six steel makers, and from the chairman of the sub-committee representing them, and they have stated to us that they would agree to the tensile strength of 65,000 lb. per sq. in. as the least limit of tensile strength, but they felt that the ductility requirements as expressed in these specifications, were very difficult for them to meet; they thought they were too high and that it would result in the rejection of from 8 to 10 per cent of their product. That is the main feature of the statement. Three members of the committee seemed to think that there might be a great deal in what the steel makers had to say, and for that reason they wished to change their views a little.

Mr. Kiesel: I fully agree with what Mr. McFarland says. I am speaking now from the design standpoint. We allow a stress of 16,000 lb. per sq. in. in side frames and bolsters. Steel that is made in accordance with the old specifications, under the lower limit, is not to stand that stress; therefore, we ought to have better steel, or we will have to increase the weight of the bolsters and side frames at least 25 and maybe 50 per cent. We absolutely have to have better steel. We get better steel now, and there is no reason why we should not make a specification in conformity with the steel we now get, and eliminate any that comes down near the lower limit, which would not be safe to use in bolsters and side frames, and possibly also couplers.

Mr. Tatum: I agree with Mr. Kiesel. We are having frequent failures all over this country with our cast steel bolsters and cast steel side frames. Our trains are delayed; we are not able to get the traffic over the country because we haven't steel in our cast steel bolsters and side frames that will meet the requirements. I don't think that we should add metal over what is reasonable for a cast steel side frame, or a bolster, in order to get the bolster or side frame to hold up under load. I believe that this matter should be referred to the railroads, and that they be given an opportunity to vote their opinion by letter ballot, and not offer it only to the convention or to the railroads at large as information. I think it would be well for the committee to know the sentiment of the railroads throughout the country. They have men in their employment who have studied the necessity of steel and its requirements, and they should be given opportunity to express their views to the committee.

Mr. Cromwell (B. & O.): I am quite sure that it would be no hardship upon the steel manufacturers if these specifications were adopted. The railroad with which I am connected has no trouble whatever in obtaining steel castings to meet these requirements. It is absolutely essential to have a better grade of steel in cast steel side frames and cast steel bolsters. As Mr. Kiesel remarked, we will have to make the castings heavier if we hold to our present specifications. The failure of cast steel side frames and bolsters is quite a serious matter, and the matter relative to the welding of these parts has been before this committee a number of times. If we had had a steel of higher quality in those frames, those parts would not be annoying you

at this time. I hope the convention here will submit the specifications to letter ballot.

Mr. Fuller: I think it would be a mistake to ignore this committee's report and simply accept it as information. Everything that has been said here so far tends to the opinion that the specifications are not unduly high. To relieve the embarrassment of the chairman of this committee, as he evidently made that motion under more or less compulsion, I would like to ask him if he will withdraw his motion so that we can put a motion before the house without wasting a lot of time, and accept the report and submit it to letter ballot.

A. W. Gibbs (Penna. Lines): I would like to ask the chairman of the committee what is the practice on which these figures are based—are these figures the upper limits of the possibilities of the steel casting, or have you allowed a good margin even as it is over the common ones?

Mr. Waring: According to the results of a large number of tests in possession of the members of the committee, these minimum figures given in the specifications are quite low, and could be easily met. Of a series of 3,000 tests, there was only one which would have been rejected under this specification.

Mr. Fuller: I do not think there is any reason why this specification cannot be met by the steel makers, and it is up to this Association to get out a specification that will meet our requirements, and if we put that specification through, I doubt if we will have any trouble in obtaining a steel that will meet it. As I understand it, there is not very much opposition to it. The tensile strength is a little high, but not enough to interfere with the general acceptance of the specification, and I would like to see the Association go on record as accepting the report.

Chairman: Mr. Waring, have you made up your mind to withdraw the motion?

Mr. Waring: As that motion represented the latest majority vote of the members of the committee, I think we ought to let it go through to a vote, and either sustain it or vote it down. I do not feel justified in withdrawing it.

The motion that this report be referred to the association as information only was then put and lost by unanimous vote.

F. F. Gaines: I move that the report be received and submitted to letter ballot in its entirety.

B. B. Milner (N. Y. C. Lines): There is one question I would like to ask. This specification covers miscellaneous castings, side frames and bolsters. We are quite concerned about the material going into the side frames and bolsters, but I am wondering what the committee would say on the question of having a separate specification for miscellaneous casting.

Mr. Waring: We thought it would be better to have one specification covering all grades of casting, since the properties specified were not particularly high, and are being met in the case of the miscellaneous castings, practically in all cases.

Mr. Milner: The committee considered that carefully, and decided unanimously that all steel castings should be covered under one specification?

Mr. Waring: Yes.

Mr. Tatum: It is not only the side frame and bolster which put the cars on the shop track, but it is the center plate and the side bearing as well, so let us have a good casting properly made for all our parts.

The motion that the report be received and submitted to letter ballot in its entirety was then put to vote and carried.

Welding Truck Side Frames, Bolsters and Arch Bars

W. O. Thompson
Chairman

THE COMMITTEE MADE A REPORT to the 1918 convention; however, it was omitted from the proceedings and the committee was requested to continue its researches and report again this year.

The Committee on Standards also referred to this committee the following from I. S. Downing, general master car builder, C. C. C. & St. L., which was received in reply to the Circular of Inquiry from the Committee on Standards: "It is our opinion that a limit should be placed on the welding and reclaiming of various parts, such as couplers, side frames, etc., inasmuch as at the present time there is nothing definite as to what extent broken or cracked couples, side frames, and the like, can be welded and placed back in service. This practice would eliminate any possibility of relying on the judgment of one man as to whether or not the part in question would be serviceable after being repaired."

Prior to the 1918 Convention the committee conducted static tests at the Bettendorf Company's plant, Bettendorf, Iowa, and at the American Steel Foundries' plant, Alliance, Ohio, on cast steel truck side frames and cast steel bolsters, some of which had been autogenously welded, whereas others were tested with cracks not welded. The results were variable; some of the frames and bolsters which had been welded failed at a point other than where the weld was located and in other cases the failure was through the weld. It also developed that some of the welds proved to be of inferior quality upon examination of the fracture.

The fact that so many cast steel side frames and cast steel bolsters are failing in the tension members is conclusive evidence of weakness in design and the welding of the fractures will not add to the strength but is likely to introduce a condition of further weakness by improper workmanship and change in the structure of the metal. It is, therefore, necessary to confine autogenous welding within specified limits on structures subject to alternating stresses and prescribe definite instructions to govern such welding.

The necessity for a greater factor of safety in the design of cast steel truck side frames and steel bolsters has been recognized by the association in the adoption of specifications including chemical properties, of load tests and limiting weights for cast steel truck side frames, as well as specifications including definite designs, limiting weights, chemical analysis and physical tests of the steel for both pressed steel and cast steel bolsters; and the United States Railroad Administration adopted definite designs of cast steel truck frames and bolsters based on those specifications and also prescribed that when renewals are necessary on existing cars side frames and bolsters in accordance with these standards be used.

It is, therefore, desirable from the standpoint of economy and safety to retire cast steel truck sides and bolsters not conforming to these specifications, as rapidly as they show signs of failure; however, it is realized that this would entail a large expenditure of money and, therefore, the committee believes that as an expedient autogenous welding should be permitted on these members within well defined limits and regulations.

Other metal car parts subject to compression only or to compression and low tension stresses may be welded. Worn surfaces of any nature and on any parts may be built up, provided that the material remaining in parts subject to high tension, such as hangers, etc., before welding, is equal to at least 80 per cent of the original section area, and in parts such as bolster guides, column castings, center plate rings, etc., the material remaining must be equal to 60 per cent of the original section area.

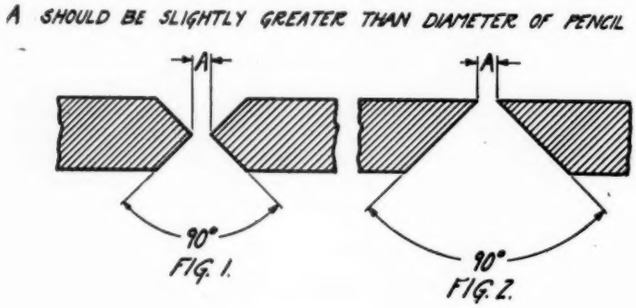
Broken coupler bodies, knuckles, locks, lifters and throwers should not be welded for the reason that reinforcing of the fractures cannot be permitted on account of interfering with the proper operation of the parts. Worn coupler bodies, knuckles, locks and throwers may be built up to the original sections, dressed and checked with proper gages to insure interchangeability and proper operation.

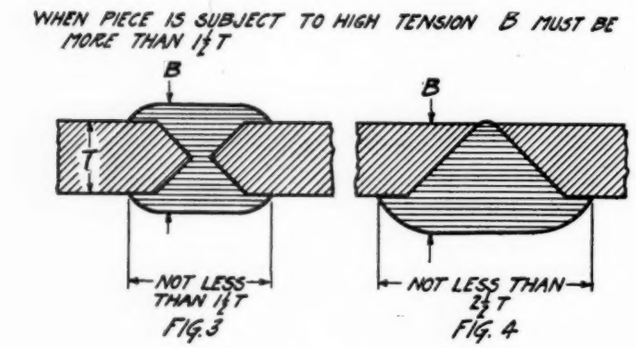
In order to determine what results would be obtained with blacksmith welding of wrought iron arch bars, four full sized pieces of 5 in. by 1¼ in. arch bar material were welded by com-

petent blacksmiths and these were tested (pull test) full size in comparison with four other bars which had not been welded. The following results were obtained:

	Lb. Per Sq. In. Ultimate Strength	Elongation Per Cent in Eight Inches
Welded bar	34,170	5
Welded bar	29,580	3
Welded bar	37,200	7
Welded bar	35,140	9
Unwelded bar	46,270	33
Unwelded bar	45,250	33
Unwelded bar	46,360	36
Unwelded bar	46,260	31

The average tensile strength shown by the unwelded bars was 46,000 lb. and the strength of the welded bars varies from 64 per cent to 81 per cent of this average, with very low elongation in eight inches. The general average of the strength of the welded bars gives 74 per cent of the average of the unwelded material. No attempt was made by the smith shop to produce a special weld but the material was handled as would be done for any ordinary welding of this character and the figures





probably represent what may be expected under ordinary conditions.

It is a simple process to form and drill arch bars and as the failure of this important member of truck construction is a serious matter, the committee is not justified in approving any process of welding which will decrease the strength of the original bar.

The committee, therefore, recommends the following:

Autogenous Welding, Limits and Regulations

I. General.—In welding, either by the use of gas or electricity, care and good judgment on the part of the operator are of prime importance. The operator's ability as to the desired proficiency should be certified by the mechanical officers in charge or by an instructor qualified by experience in general railroad welding with the method involved.

The metal added is liable to be porous and relatively brittle. The heat at the surfaces welded affects other sections near the weld, tending to reduce strength and toughness.

The following general rules must, therefore, be carefully observed:

II. Welding cracks or fractures will not be permitted on the following: Axles, arch bars, car wheels or tires, track equalizers, spring or bolster hangers, brake staffs, brake wheels, coupler bodies, knuckles, knuckle pins, locks, lifters and throwers.

Parts made of alloy steel or heat treated carbon steel. Top chord angles of open top all steel cars if the fracture is located at a point between bolsters more than five feet from the center of either body bolster.

III. Building up worn surfacs will be permissible on the following:

Parts subject to compression only.

*Spring or bolster hangers, holes in levers.

†Center plates, truck sides, bolsters and column castings.

Journal boxes, coupler bodies, knuckles, locks, lifters and throwers. After building up to the original section, the same must be dressed and then checked with proper gages to insure interchangeability and proper operation.

Flat spots on rolled steel wheels and tires if thickness of tread is 1 in. or more above limit of wear groove.

* Provided that the material remaining in the part is equal to at least 80 per cent of the original section.

† Provided that the material remaining in the part is equal to 60 per cent of the original section.

IV. Welding cracks or fractures will be permitted on the following:

Parts subject to compression only and general car parts not subject to high tension strains except as otherwise prohibited.

Car and roof sheets.

*Cast steel truck sides.

*Pressed and structural steel truck sides, bolsters and transoms.

*Cast steel bolsters.

Draft castings.

*Brake beams.

*Case steel coupler yokes.

Car sills, posts, braces, stakes, carlines, side plates and end plates.

* Welding is permitted only when the area of the crack is less than 2-5, or 40 per cent, of the total area through the section at the point of fracture, but it is not permissible to weld any crack located within 6 in. of an old weld.

Regulations for Welding

V. (a) All parts marked (*) in Section IV, except truck transoms, must not be welded unless removed from the car or truck. Truck transoms may be welded in place by removing the truck from under the car body.

(b) The edges of pieces for welding must be prepared as shown in Figs. 1 and 2. If both sides of the fractured member can be worked upon, the fracture should be prepared as per Fig. 1, and where only one side of the fractured member is accessible, Fig. 2 should be followed. The entire crack should be burned or chipped out far enough back so that there will be no portion of the crack in the metal. Failure to do this permits the check or crack to work its way across the metal to the farther side, due to the constant vibration, even after the weld has been made. A hole may be drilled at the end of the crack or check and chipped or burned towards the hole. The surfaces where new material is to me deposited must be clean and bright and reasonably smooth and, therefore, if the surfaces are prepared by the burning process the surfaces must be finished by chipping before welding.

(c) The portion of the part adjacent to the fracture should be heated before the welding is begun. In welding, the operator should begin to weld at the point farthest away from the outside edge and work the weld towards the edge. All efforts must be made to prevent oxidization, and to accomplish this the work should be placed at an angle that will allow the blowing out of all slag or impurities in the fused metal. Giving the torch a rotary movement will assist in their removal.

(d) The new material must be deposited to the form shown in Figs. 3 or 4 in order to properly reinforce the weld, and *B* should be somewhat greater than *T*. For the important items marked (*) and (†) in Section IV, as well as for car sills, posts, braces, stakes, carlines, side plates and end plates, *B* must be at least 1½ times *T*.

(e) The parts marked (*) in Sections III and IV, with the exception of truck transoms welded in place, must be carefully annealed by uniformly heating to approximately 1,400 or 1,500 degrees F. and allowed to cool slowly in the atmosphere.

(f) Worn surfaces permitted to be built up to the original section by depositing of new metal thereon must first be made clean,

bright and fairly smooth, and after the metal is deposited must be dressed to the required dimensions and gaged where necessary.

(g) When truck side frames and bolsters are welded the weld must be made smooth and the following record legibly stamped on the weld by at least ⅜-in. steel stencils, in the following form:

(Mo.—Day—Yr.) o——oo——oo	(Railroad) A. B. C.
XY (Shop Abbreviation Mark)	X (Welder's Identification Number or Mark)

VI. It is also recommended that reference be made in the Rules of Interchange to the effect that autogenous welding, by either gas or electric process, when performed must be strictly in accordance with these limits and regulations. The present price in the Rules of Interchange, Rule 107, Item 432, will not properly compensate the party performing the welding according to these regulations, and should be revised. A penalty should also be prescribed in the Rules of Interchange providing for the erection of any car on which a truck side frame or truck bolster is welded, after the adoption of these regulations, when not conforming to same.

The report is signed by W. O. Thompson (Chairman), New York Central; G. W. Rink, Central Railroad of New Jersey; J. T. Walls, Pennsylvania; J. J. Hennessey, Chicago, Milwaukee & St. Paul; A. M. McGill, Lehigh Valley; R. W. Schulze, St. Louis-San Francisco; Willard Kells, Atlantic Coast Line; J. R. Gould, Chesapeake & Ohio; E. H. Sweeley, Long Island and C. F. Giles, Louisville & Nashville.

During the reading of the report Mr. Thompson said: Your committee would like to have the paragraph in the middle of page 4, reading: "Flat spots on rolled steel wheels and tires, if thickness of tread is 1 in. or more above limit of wear groove," eliminated from the report, because after giving the matter further consideration we do not believe it is good practice to have that inserted.

Discussion

At the conclusion of the report Mr. Thompson said: There was a part of the report which was not printed, and that is that the thanks of this Association are due to The Bettendorf Company, The American Steel Foundries, and the Pennsylvania Railroad for placing all of their appliances at our disposal and for the considerable time and amount of money that was spent in the long extended experiments made with regard to welding.

Mr. Fuller: The committee's report has one recommendation that is all right, but I think you all ought to understand it. The last paragraph of the report reads as follows:

"A penalty should also be prescribed in the Rules of Interchange providing for the rejection of any car on which a truck side frame or truck bolster is welded, after the adoption of these regulations, when not conforming to same."

That should be carefully considered, as I presume there are hundreds and thousands of cars with the truck side frame or truck bolster welded, that have been welded for years, and are in use, and this paragraph may be the means of rejecting quite a number of cars.

Mr. Gaines: Mr. Fuller is right in this matter, and rather than make that penalty operative immediately, it would be better to set a future date, when the matter will become effective, so that we can gradually eliminate these cars. I would like to ask why the committee desires to cut out the recommendation relative to flat spots on rolled steel wheels and tires, if thickness of tread is 1 in. or more above limit of wear groove.

Mr. Thompson: They do not stick and you have a flat wheel, which is a great deal worse than what you had before.

A. W. Gibbs: I would like to ask, in connection with Section IV, on page 4, why it is stated "Welding cracks or fractures will be permitted on the following: 'Parts subject to compression only and general car parts not subject to high tension strains except as otherwise prohibited."

Why is the welding of bolsters and truck frames confined to the compression members only?

Mr. Thompson: It is hard to define what the tension and compression is in truck sides and bolsters. There are times when they are in tension and other times when they are in compression. It would be hard for anyone to say what are the tension members and what are the compression members in these two parts.

W. J. Tullerton (Rock Island): In welding these flat spots on rolled steel wheels and tires, did you use the electric process as well, and did you have the same difficulty with the welds giving out when you used the electric weld? It is a well-known fact, that you cannot use the acetylene process for this purpose, as well as the electric process, for the reason that the acetylene calls for pre-heating, which the electric process does not. I think it is a mistake to condemn the welding up of flat spots on rolled steel wheels and steel tired wheels, until we know the reasons.

Mr. Thompson: Both processes were tried, and we could see no difference between the two in the result.

John A. Pilcher (N. & W.): I wish to point out in Paragraph 4, the first statement, as follows:

"The fact that so many cast steel side frames and cast steel bolsters are failing in the tension members is conclusive evidence of weakness in design, and the welding of the fractures will not add to the strength, but is likely to introduce a condition of further weakness by improper workmanship and change in the structure of the metal."

There are exceptions to that, because the stresses in the side frames can be very much increased by improper spring capacity; that is, any roughness in the track transmitted to the spring causes stresses to be set up which are indefinite, so there is a possibility of improper spring design affecting the breakage of the side frames, irrespective of the weakness of the casting I want to take exception to that particular paragraph, because the spring must be properly designed to take care of the load, to avoid the breakage of the side frames.

There is another thing to which I desire to call attention. Under heading III—"Building up worn surfaces will be permissible on the following:" I notice they do not mention the building up of collars on axles. This is a source of great saving, and where the collars are built up simply to prevent their excessive lateral movement, it will not materially affect the strength of the axle, because the stresses are immaterial at that point. I wonder if that feature cannot be introduced—the building up of collars on axles.

Mr. Thompson: The committee did not consider the question of the building up of axles, but it is a question if that would not be in the same category as the steel-tired wheels would be. That is something, as I said before, that we did not look into.

The fact that so many cast steel side frames and cast steel bolsters are failing in tension members is conclusive evidence of weakness of design. When you consider the way the side frames are breaking down and the results we are experiencing from their breaking down, I do not believe that you could arrive at any other conclusion. Conditions have changed greatly since these truck side frames and bolsters were designed. The roads are carrying heavier loads and the service is more severe, all tending to the conclusion that the side frames were not designed for the service they are giving at the present time.

Mr. Gaines: I hope before the report of the committee is printed they will include the building up of collars on axles, as it will save many axles that now have to be thrown out. As to the building up of tires, I believe if you used the electric arc and the weld is made properly, that it can be done, and before we turn that proposition down finally it should be tested out further, because you can save money by welding up spots in the wheels by that process.

John McMullen (Erie): We have had a good deal of experience in electric welding flat spots on wheels. We have welded cast steel wheels and rolled steel wheels, and used them under our passenger cars, where we could see them and follow them up, and the results obtained have been very satisfactory. If the flat spot is properly cleaned off and cut in around the edges, and the weld is then made, rather than to apply it right on top, I do not think we will have any trouble with the electric welding process.

We have built up the collars and reclaimed a great many axles. The price of axles to-day is such that I think we are justified in building up these collars. We have reclaimed many

couplers, and I think if there is a slight crack down the back wall of the coupler it can be satisfactorily welded and reclaimed.

Mr. Tatum: Referring to paragraph four on page two, I am inclined to agree with the statement of the report. There are a number of side frames used on the trucks of various railroads in which the design is not proper, causing a number of them to fail. Another cause for the failure of truck frames is that they are not made of proper metal. As Mr. Pilcher says, because of weak springs the frames do get punishment. The truck frame receives more punishment than if you had a spring doing good work, but that makes no difference, in view of the committee's report that we had in service truck frames which show evidence of weakness in design.

The idea of building up the collar of the journal is very desirable. A great number of axles have been reclaimed by building up the collar of the axle, and I believe the committee should give that very thorough consideration.

Slid flat steel wheels and steel tired wheels have been successfully reclaimed when the work of building up the flat spot has been properly done.

I cannot agree with the reclaiming of the couplers.

J. G. Dickson (Oregon Elec. Ry.): Were the side frames tested, as mentioned in paragraph three, annealed for the welding, or were they welded without annealing them?

Mr. Thompson: They were experimented on, annealed and not annealed. We tried out every scheme we could think of.

Mr. Dickson: The Oregon Electric Railroad has been successful in welding flat spots by the electric process. We found the best material to use in filling in was cuttings from steel tired wheels. We had difficulty when we used other metal, but when using that metal we had good success, and I would not like to see this Association go on record against welding flat spots.

Mr. Thompson: The opposition to the recommendation of the committee, with regard to the matter of not welding the flat spots, has only been on the part of men who are operating suburban service, or electric railway service, which is a comparatively light and easy, but let us hear from some of the members who are running 120,000 lb. or 140,000 lb. capacity coal cars, and heavy trains.

C. E. Fuller (U. P.): We have been and are welding flat spots on steel wheels, and steel tires, with successful results. We would not think of removing a pair of wheels, or removing a tire, from service today because of a flat spot. We would use the electric weld, and if the work is properly done there is no question about its being a success. We have never welded any flat spots on wheels with the oxy-acetylene process.

We are reclaiming axles with worn collars. It would be a waste of material to throw axles away because the collars are worn ⅛ or 3/16, or even ¼ in. This committee should embody these items in its report, and should change the last paragraph on page 7 regarding the penalty, so that it will not compel us to take out of service side frames that have been welded and are giving good service.

The trouble is that some of it has been done in an improper manner. We have had lots of trouble from bad welding, but we have got to a point where we feel that we can weld safely, and I know of truck frames today that have been in service five or six years, and they are giving good service. I do not believe that anybody would ask to take them out of service because they had been welded.

The welding of some of the side frames has been done without regard to the service the truck frame is to perform—there have been too many tension members of improper design and bad steel that have been welded, and they have caused lots of trouble.

F. W. Brazier: The way I understand the recommendation of the committee is that in the future, any welding that is done must conform to the methods prescribed after a certain date. The date must also be attached, showing when the welding is done. If you get a car in the future with this date on it, and the welding is not done in conformity with the recommendations prescribed by the committee, you have the right to reject the car and that is the important point.

Frank McManamy (U. S. R. A.): The committee has rendered an excellent report, and while there may be some points not fully covered, there is so much good in the report that the committee should be congratulated on it. In the paragraph Mr. Fuller refers to, I believe his interpretation may be due to a comma, which is misplaced. The clause reads: "A penalty should also be prescribed in the Rules of Interchange providing for the rejection of any car on which a truck side frame or truck bolster is welded, after the adoption of these regulations, when not conforming to same." The trouble comes with the comma after the word "welded."

The object was to provide a penalty in the case of welding that is done after the adoption of these regulations, taken in connection with the date at the bottom of page six, and then I believe that the report of the committee will not be subject to the objection raised by Mr. Fuller. Autogeneous welding is one of the most useful processes we have now in railroad work, but it has come near being discredited, due to the inefficiency of the operator.

We have been attempting to do things by means of autogeneous welding which we ought not to do, and I think in the interest of safety as well as economy, that considerable of that work might be reduced, and the rest of it more carefully supervised, particularly with respect to the efficiency of the operator.

Mr. Fuller: I am glad to have had pointed out my misinterpretation or misunderstanding of the paragraph referred to. I have no objection to the rule if it applies to welding after the date set.

(At this point, Mr. Tatum called attention to errors regarding truck equaliizers and top short angle, which should be top chord angle.)

Mr. Fuller: I would like to make a motion that the report of the committee be adopted, leaving in the building up of flat spots on wheels. I would like to see the word "electric" used in connection with welding, and also request the committee to put into the report a section relating to the building up of collars on axles.

H. C. Oviatt (New Haven): I would like to get straightened out on the question whether the committee experienced any trouble in building up flat spots where the thickness of tread was more than one in. above the limit of wear groove.

Mr. Thompson: The allowable limit of running the tire would be about one in. It was not considered good practice to try to weld a truck member, when it is weak, if it is under one in. thick.

H. C. Oviatt: As I read this, it says this is permissible when the thickness of the tread is one in. or more above the limit of wear groove.

Mr. Thompson: We considered anything below one in. was not worth it anyway.

H. C. Oviatt: Was there any experiment made with tires more than one in.?

Mr. Thompson: A great many, both by the electric and acetylene processes.

H. C. Oviatt: They were satisfactory?

Mr. Thompson: No, they were not satisfactory; that's the reason we backed up on it.

Mr. Kleine: This committee has been continued from year to year, and it has finally presented a report which I think we can all go along with. There are requests for certain additions to the report, but rather than adopt them on the floor or read them into the report of the committee, it would be better to continue the committee for another year, and let it look into the proposition of welding collars on axles, welding flat spots on wheels, and also the welding of couplers. I amend Mr. Fuller's motion that the report of the committee be accepted as read by the chairman and referred to letter ballot, and the committee continued to report on the items which were brought out in the discussion.

Mr. Gaines: Before that motion is put I would like to have the vote on Mr. Fuller's original motion. The building up of flat spots is not an experiment; it has been going on for years. It is common practice and good practice, and as long as we can reclaim a whole lot of material, let those that want to do it do so.

Mr. Kleine: This would in no way stop any road from continuing its present practice, but I don't believe that the Association should recognize it as an accepted practice until the committee has had an opportunity to go into it further. I would refer the members to the report of Mr. Miller on Autogenous

Welding, that appears in the 1918 *American Engineer,* which absolutely condemns the practice. That was a very carefully considered report, and, therefore, I don't think we should take any precipitate action.

Mr. Gibbs: I would like to ask the chairman of this committee, referring to paragraph four of page four, would it be a very difficult job to introduce into this report drawings of typical side frames and bolsters, and indicate the parts that should not be welded. I think that would clear up the ambiguity. You have a pretty clear idea of the parts that should not be welded; would it be much trouble to do that?

Mr. Thompson: That is a very good suggestion, Mr. Gibbs. It would not be much trouble at all.

Mr. Fuller: Do I understand that the amendment carries with it the two suggestions that I made? My motion was to reinstate the paragraph covering the welding up of flat spots and also adding to the report the building up of collars on axles. Does your motion include those, or not?

Mr. Kleine: My motion eliminates those two items, and simply defers them for further investigation for the committee to report upon next year.

Mr. Sillcox: One thing to consider is the number of cars which are going to be tied up in this country on roads which are isolated and have to move equipment, where you have to weld the arch bars and the truck side frames. Some roads weld these frames and paint them. We had a train wrecked the other day that was one of the worst disasters we faced this year, and the train had passed four inspection points. The truck frame had been welded and thoroughly painted and the best inspector in the world could never have detected that condition. We can't get arch bars to points way out in the mountains on a 12,000 mile railroad, unless we tie the car up for two or three weeks. The question of whether we would render a bill for a welded arch bar should be brought up, or some explanation should be given how this would be included in the rules and applied. If the committee is to carry on its work it should be prepared next year to tell us how that would be controlled.

Mr. Tatum: I don't quite understand Mr. Sillcox. I would like to ask him if he thinks we should continue welding side frames and arch bars, or whether we should discontinue it.

Mr. Sillcox: I don't say that the universal practice is good, but there are cases where you have to weld the arch bar. If you have the car in a big shop, where you can put a new arch bar in, that is the thing to do; but if you have a car 200 or 300 miles away from a point where can you obtain the proper arch bar? You have to keep the car moving somehow, and you are going to tie up a world of cars this way if you have to tie up to put in new arch bars.

Mr. Tatum: It would be far better to tie up a car than to allow it to go out on the railroad and tie up many more cars and destroy the property of the railroad, and tie up the traffic.

Mr. Gaines: I would like to ask Mr. Thompson if the committee's report bars the welding of arch bars in a blacksmith fire. We are talking of two things, the welding by autogenous process is one, but it does not say the arch bar must not be welded in an open blacksmith fire in the old way.

Mr. Thompson: Perhaps we don't say that, but that is what we meant; it should not be welded at all.

Mr. Fuller: This Association should go on record as absolutely prohibiting the welding of an arch bar, either in a blacksmith shop or any other place.

The Chairman: Any further remarks? If not, the amendment is before you. Will you please state your amendment again, Mr. Kleine?

Mr. Kleine: That the report of the committee, as read by the chairman, be adopted, and submitted to letter ballot for adoption as recommended practice, and the committee continue to consider the question of welding of collars on axles, the welding of flat spots on wheels, and the welding of couplers.

Mr. Tatum: Do I understand that motion to intend to stop the building up of solid flat wheels during the period that this investigation is going to be made?

Chairman: No.

Mr. Kleine: You can use your own option about that in the meantime; simply not recognizing it as recommended practice.

Mr. Fuller: Evidently there is some confusion here. I asked Mr. Kleine, who seconded my motion, whether or not that left out, as the chairman read, on page 4, the paragraph "Flat spots on rolled steel wheels and tires, if thickness of tread is 1 in. or more above limit of wear groove." Now, Mr. Kleine says: "The report as it stands." To make this clear, I think the members should have both motions, and my motion was to reinstate this item and also add into the report the building up of collars on axles.

The amendment was put to vote and carried.

The Report of the Committee on Couplers

R. L. Kleine
Chairman

WITH THE ADOPTION, last year, of the details, such as contour line, design of 6 in. by 8 in. shank, etc., for the M. C. B. Standard *D* coupler, the duty assigned to the committee to present to the association a one standard coupler has been completed. To realize the benefits of this work it is essential that the coupler be placed into general use as soon as practicable. The design has passed the experimental stage and the coupler manufacturers are in a position to furnish the coupler in any quantities desired.

To accomplish the universal use of the standard coupler, the committee recommends the following program: (A) Make it mandatory that all new cars built after a certain date be equipped with the M. C. B. Standard *D* coupler with 6 in. by 8 in. shank. (B) Make it mandatory that after the present stock of 5 in. by 7 in. couplers is used all future renewals will be made with the M. C. B. Standard coupler with 5 in. by 7 in. shank.

NOTE.—On existing cars equipped with 5 in. by 5 in. shank couplers, the present type of coupler should be maintained except where cars are changed in the draft arrangement when provision should be made for applying either the 5 in. by 7 in. or the 6 in. by 8 in. shank M. C. B. Standard *D* Coupler. It is impracticable to apply the standard type *D* coupler to the 5 in. by 5 in. shank.

In order to carry out this program the committee recommends the following changes in the M. C. B. Rules of Interchange for Freight Cars: (A) Add the following paragraphs to Rule No. 3:

I. Cars built after June 1, 1920, will not be accepted in interchange unless equipped with 6 in. by 8 in. shank M. C. B. Standard *D* couplers.

II. Existing cars, equipped with 5 in. by 7 in. shank couplers of the present types, when requiring coupler renewals, shall have 5 in. by 7 in. shank M. C. B. Standard *D* couplers applied. This rule to be effective when present stock of new and second-hand 5 in. by 7 in. shank couplers has become exhausted.

III. Existing cars equipped with 5 in. by 7 in. shank couplers shall have the existing type of couplers maintained in repairs. Where changes are made in the design of the draft arrangement, provision should be made for the application of either the 5 in. by 7 in. or 6 in. by 8 in. shank M. C. B. Standard coupler.

Uncoupling Attachments—Revision of Standard

The General Committee instructed the Coupler Committee under date of February 25, 1919, to consider revising the standards for the uncoupling arrangements shown in the Master Car Builders' Association Standards, Sheet 19-B, with a view of providing a standard in accordance with Paragraph (m) of Rule 3 of the 1918 Code of Interchange Rules and with the United States Railroad Adminstration's standard.

Rule 3 (m) reads as follows: Cars built after January 1,

1919, must be equipped with coupler operating lever connected direct with coupler lock or locklift without the use of links, clevises or chains. The United States Railroad Administration Standard reads: Coupler operating device to be of the top operating type without the use of clevises, links and pins; that is, to be direct connected to the locking-block. Apparatus to be in accordance with condition drawings. United States Railroad Administration, Division of Operation, Mechanical Department Circular No. 8 reads: Coupler operating device to be of type directly connected to coupler knuckle lock without use of clevis, link, chain or pin and to be interchangeable with operating device on United States standard cars where possible. United States Safety Appliance Standards provide for uncoupling levers to be either single or double, and of any efficient design with prescribed dimensions for various types of uncoupling levers including those which employ clevises and link, and provide penalties for uncoupling levers not conforming to the detailed specifications.

The M. C. B. Standard *D* coupler makes provision for both top and bottom operation, the latter being necessary for cars with low height of floors from rail and where it is desirable to keep all portions of the uncoupling arrangement below floor line.

The object of changing the standard is to provide an uncoupling lever that is entirely connected to the locking-block or locking-block lifter and avoid the defects existing in levers which employ clevises, chains, pins and cotters. On account of the United States Safety Appliance Standards providing certain specifications for the various types of uncoupling levers used, it is necessary to retain these specifications in the standards. It is also desirable to retain the bottom connection for certain cars that require it. The types of uncoupling levers directly connected to the locking-block or locking-block lifter are covered by letters patent which, under the rules, prevent adoption of any specific design. It is, therefore, the suggestion of your committee to provide for the uncoupling rigging directly connected to the locking-block or locking-block lifter by making the following changes in the standards: 12. (A) Plate M. C. B. 23-A. Eliminate the uncoupling attachments (links, clevises, pins and cotters) shown on this plate. (B) Plate M. C. B. 19-B. Add a heading over the cuts, reading: "For Existing Cars Only." Add the following to the right of the cuts: "For New Cars and Application of New Design Uncoupling Levers to Existing Cars." Coupler operating device must be of a type directly connected to the coupler knuckle locking-block or locking-block lifter without the use of clevises, links, chain or pin and must conform to the detailed specifications prescribed in the United States Safety Appliance Standards. (C) M. C. B. Proceedings, 1918, Page 607, Heading: Change Recommended Practice to Standard.

On Page 607, eliminate the paragraph at the bottom of the page relating to chain conection. Page 608, eliminate the last sentence in the first paragraph reading: Details of uncoupling rod chain are shown on sheet M. C. B. 23-A. Page 608, add a new paragraph after the second paragraph at the top of the page, reading: In 1919 the standard for uncoupling levers for new freight cars and application of new design uncoupling levers to existing freight cars specified that the coupler operating device must be of a type directly connected to the coupler knuckle locking-block or locking-block lifter without the use of clevises, links, chain or pin and must conform to the detail specifications prescribed in the United States Safety Appliance Standards.

(D) 1918 Proceedings, Page 553. Add a paragraph after the second paragraph at the top of the page, reading: In 1919 the Standard for Uncoupling Levers for new freight cars and the application of the new design uncoupling levers to existing freight cars specified that the couple roperating device must be of a type directly connected to the coupler knuckle locking-block or locking-block lifter without the use of clevises, links, chain or pin.

(E) M. C. B. Proceedings 1918, Plate B, Safety Appliance Standards for uncoupling levers, following Page 574: Add the same notes as provided for Plate M. C. B. 19-B and covered in foregoing paragraph (B).

In conclusion the committee recommends submitting to letter ballot the following: Coupler operating device for new freight cars and the application of new design coupler operating device to existing freight cars must be of a type directly connected to the coupler knuckle locking-block or locking-block lifter without the use of clevises, links, chain or pin and must conform to the detailed specifications prescribed in the United States Safety Appliance Standards.

The report is signed by R. L. Kleine (Chairman), Pennsylvania; F. W. Brazier, New York Central; F. H. Stark, Montour; E. J. Brennan, Chicago, Milwaukee & St. Paul; J. W. Small, Atlantic Coast Line, and J. A. Pilcher, Norfolk & Western.

Mr. Kleine: You will note that we don't specify any given date, for the reason we desire to give the railroads an opportunity to use up their present stock of couplers, either new or second-hand. I have an inquiry from one of the members in regard to the specification for uncoupling levers. It is understood that the recommendation for uncoupling levers simply relates to the connection of the uncoupling lever to the locking block, or locking block lifter, and does not take in any other part of the uncoupling lever.

(Mr. Tollerton occupies the Chair, during absence of Mr. Chambers.)

Mr. Tatum: Mr. Chairman, I note the recommendation at the conclusion, "your committee recommends submitting to letter ballot the following: 'coupler operating device for new freight cars and application of new design coupler operating device to existing freight cars must be of type directly connected to coupler knuckle block or locking block lifter without use of clevises, etc.'" I thought that if the committee gave consideration to requiring that the standard that it has recommended be adopted on cars receiving a change in the device, why not extend it a little further, and say, "when new operating devices on the existing cars are manufactured, that they be made to conform with the new standard." Why should we perpetuate the old device.

Mr. Kleine: This is a matter of interchange, interchange could not control the manufacture, but they can control the application.

Mr. Tatum: The idea that I want to bring out is that a number of the railroads are manufacturing the old device, perpetuating the old existing trouble. In manufacturing the old device the railroads manufacturing it are making themselves liable to frequent penalties because the device is not always found operating, and I believe the sooner we understand the conditions and get away from the old device and put in a device that will prevent these violations of the safety appliance law, the better off our railroads will be, and the more our men will be protected.

Mr. Brazier: It would seem to me after all the arguments that have been made in years gone by and with the reports of the Interstate Commerce Commission inspectors showing violations—there have been more penalties attached to the system of the old method of chain clevises, and if you keep acmount of it very carefully, you will find you are spending thousands of dollars a month in maintenance. The average road that is spending money on equipment today should put in the new uncoupling device in the reclamation work as well as in the new care.

Mr. Gaines: I agree with all that has been said about incorporating something of that kind, but I don't think you can put it in that paragraph because this is an interchange.

Mr. Kleine: I may explain that the report covers two devices; one, the interchange, and the other the recommended practice. In the recommended practice, your recommended practice would read this way: "Coupler operating device for new freight cars and application of new design coupler operating device to existing freight cars." It is covered right there.

Mr. Gaines: There are two distinct things we have here: one is a recommendation of letter ballot relative to the couplers; then, if I understand it, the committee also makes a number of recommendations for recommended practice in addition to that. I move that the matter be accepted and referred to letter ballot, both questions.

Mr. Tatum: I don't quite understand how this is going to be referred to letter ballot. Is it going to be referred by letter ballot for the roads to vote whether or not the manufacture of new uncoupling operating devices for old cars in existence is to be in accordance with the new recommended practice?

Mr. Kleine: Inasmuch as this is a change in the standards, it should first be approved by letter ballot, and then the change made in the Interchange Rules.

The motion was then put to vote and carried.

The Report of the Committee on Draft Gears

SUBSEQUENT TO THE 1916 M. C. B. convention, the committee addressed a circular of inquiry to the railroads with a view of ascertaining the kind and capacity of draft gears in service, travel, performance, sustained capacity in service and repairs, also sill spacing, coupler attachments, riveted versus key connection between coupler and attachments, draft lug spacing, overall length of gears, coupler horn, clearance, etc. Replies to this circular were received covering a total of 1,678,000 cars owned. The data received gives a very fair idea of the gears in service, forms of attachments used, spacing of sills, etc., but the information is very meager, generally, as to the efficiency of the gears in service, cost of maintenance, practicability of repairs and capacity of repaired gears, although valuable data are included on tests of two types of draft gears taken from service before repairs were made, as well as tests of these gears after repairs.

It was felt essential that gears should be thoroughly tested out, not only when new, but after they had seen service, as well as after repairs had been made to gears taken from service, also that such tests should be made approximating as closely as possible actual service conditions, eliminating variables as far as possible. The static machine gives a certain comparison as determined by its diagram and absorption of work but does not measure the capacity of the gear as a shock absorber. The 9000-lb. drop test machine will measure the height of drop at which various gears will close, and, therefore, can be considered a relative measure of shock-absorbing capacity in different gears; however, the weight used is so much less than in actual service that the question arises whether the weight and height of drop of the test machine is comparable to the weight and speed of a loaded car in service, and if a gear so tested in a 9000-lb. drop test machine will have the same relative efficiency in service under the heavier weight car and slower speed. The 15,000-lb. single pendulum machine in conjunction with the 30,000-lb. car on level track, as used by the Union Draft Gear Company, is another form of drop testing and is comparable with the drop weight. The Symington test plant for testing draft gears in full-sized freight cars. (See *Railway Age*, issue of May 2, 1919, page 1097.) This testing arrangement represents more nearly actual service conditions than any of the tests previously referred to. It, however, necessarily includes a number of variables, but is no doubt valuable for check testing and action under service conditions.

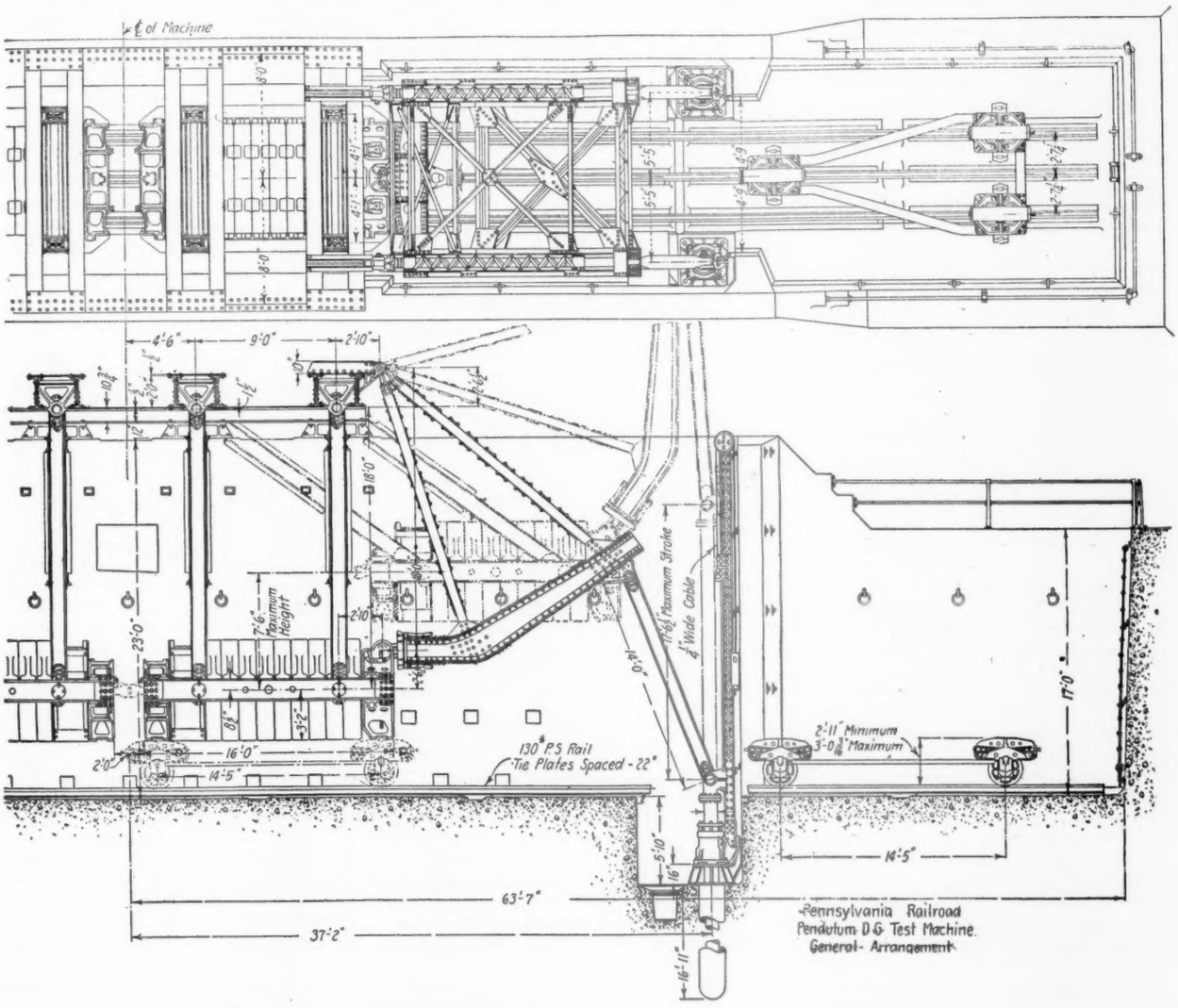


Exhibit A.—General Arrangement of Pennsylvania Draft Gear Testing Machine

In order to reduce to a minimum all variables and for the purpose of accurately measuring impact blows, recoil, etc., the Pennsylvania designed a pendulum draft gear testing apparatus (Exhibit *A*), consisting of two weights of 200,000 lb. each,

suspended from a suitable framework with provision for applying different draft gears. The weights may be varied up to 200,000 lb. as found desirable. It was the purpose of the Draft Gear Committee to use this machine in tests conducted by it, but on account of the war, the machine has not been built.

On June 7, 1918, C. B. Young, Manager, Inspection and Test Section, Division of Operation, United States Railroad Administration, advised it is the desire and intention of that section to make an extensive test of draft gears to determine what a draft gear should be, and also the value of the draft gears now on the market measured by the ideal standard, and invited suggestions and recommendations of the Draft Gear Committee, draft gear manufacturers and railroad officers. The committee acted upon this invitation and placed at the disposal of the government all the data and tests that had been collected, as well as their views in connection with the tests to be conducted. After outlining their plan of procedure, the Inspection and Test Section of the United States Railroad Administration conducted tests of draft gears on the static and drop test machines, for the purpose of calibrating the gears used in the cars at the Symington testing plant, which were started April 10, 1919, and to which the committee has been invited.

In order to avoid duplication of work and entailed expense, this committee has suspended making any tests of draft gears, but will work in close harmony with the United States Railroad Administration, Inspection and Test Section, and thus have available the results of these tests.

The report was signed by R. L. Kleine (Chairman), Pennsylvania; Prof. L. E. Endsley, University of Pittsburgh; W. E. Dunham, Chicago & North Western; J. R. Onderdonk, Baltimore & Ohio; A. R. Kipp, Minneapolis, St. Paul & Sault Ste. Marie; G. W. Rink, Central of New Jersey; J. C. Fritts, Delaware, Lackawanna & Western; R. D. Smith, Boston & Albany; A. M. Darlow, Buffalo & Susquehanna, and H. C. May, Chicago, Indianapolis & Louisville.

Discussion

Mr. Kleine: I may say, subsequent to describing the testing machine at the Rochester plant, that this description is prior to the time that the U. S. R. Assn. test section took up the work. It has added considerable to the machine which brings it up to date. Mr. Kadel, who is the engineer in charge of the tests at Rochester, is here, and I believe we should hear from him on the progress of these tests.

A motion to accept the report was carried.

Mr. Kadel: In taking up the work of testing draft gears for the Railroad Administration, we have given consideration to all of the methods of testing that are in vogue, and in assembling cars for testing, we put them through all of the recognized tests that might show any results, and in our tests, at this time, we have 16 different types of draft gears. These will, undoubtedly, be added to as there are several more being considered, and I think the total would be about 20 when we complete the program. The gears were first assembled at Baltimore, and were given their static tests, a 9,000 lb. drop test on solid anvils. On Mr. Onderdonk's gear-testing machine the gears have been carefully calibrated to see just what results they show there, and we have made destruction tests in testing the gear under the 9,000 lb. drop test. We know just what it takes now to first start destruction of any gear under that test. The gears were then taken to Rochester and are now being carried through tests in the Rochester plant of the Symington Company, and at that plant we are recording the exact striking velocity, the exact impact velocity, and when I say exact velocity it means the velocity at the instant of impact, which is somewhat different from the average velocity over a long length of track.

We get the exact amount that the draft gear closes. We are taking each type of gear, first running two tests with one of each type on each of the two cars that are there; then we take the gear out of the striking car, and put in a solid buffer of 24 sq. in. area, and we run a test with another gear in the struck car. In the standing car we get some additional new action on the draft gears, whether there be one or two gears. We get the exact amount that these draft gears close at different speeds, and we get a different measure of cushioning value. When we say cushioning value, we do not mean absorption, because a spring draft gear, whatever its capacity, has just as much a cushioning action as a friction gear that may absorb all of the shock. They are two entirely different things. But we are also getting the absorption, because the absorption is a very important feature. The absorption spells absence or presence of what we call recoil, your kick-back in cars, and we are getting the cushioning value and the effect of recoil also in impact tests. We are able to tell you just what the gears do as they close, and how long it takes them to close, how far the cars travel while they are closed, how long it takes them to open—that is, what period of time, and how far the cars travel while they are opening. We tell you how much the striking car was decreased in speed by the closing of the gear and how much it was decreased by the opening of the gear. We tell you on the struck car how much its speed was affected by the closing and how much by the following release of the gear. There is one class of tests that properly should precede all of these that we have not been able to even begin, and that is the tests on pulling, the tests that are really road tests of draft gears, and should properly precede all other tests in the determination of an ideal draft gear. Draft gears, first of all, must hold cars together, they must enable us to handle cars in trains, and then, after they do that, we must get just as much cushion value and absorption value as we can get to keep destructive loads off the sills.

Briefly, that is the work going on at Rochester. The Draft Gear Committee is taking an active part in that work and have a representative there at all of the tests. Mr. Slaughter of the Pennsylvania Railroad has been named by the committee to attend all of these tests, and is in constant attendance there. The Symington Co.'s plant has always been a valuable testing plant for draft gears. The original plant of the Symington Company had means for measuring a draft gear closure, the distance the cars traveled, and a seismograph on each gear. There has been added to that a double drum, alongside of the track, setting on a base on the ground. That track is stationary with respect to the ground. The struck car is, what we term the B car, ordinarily the standing car, and it has means by which a pencil on the car draws a line on the drum. The other car drops down an incline, and as it approaches the first of these two drums it picks up a pencil there and draws a line on that drum, at the same time that the B car is drawing its line on the other drum. The two drums are running on a common shaft at exactly the same speed, and we have a very simple and very accurate means for marking the cars, so that we can time them together, both lengthways to the drum. When this pencil is used we can time them exactly around the drum, so that we know at any point around the drum just exactly where the two pencils stood, and from the two drums working on the same shaft at the same speed, we know exactly what each car was doing at any instant. We can trace the whole path and the whole action of the two cars all during that impact. There is only one way to really measure the path of the travel of any body. If it is a resilient body we would have to take the record from the center of the mass and we would have to apply the force to the center of the mass, but unfortunately we cannot do that. We could approach it, but we can never obtain it absolutely. So we are always going to have some resilience, some elastic yield in the car body, and that makes trouble for us, but we get mighty good records in spite of that.

We found that if you take a draft gear and test it under the 9,000 lb. drop, for example, we get practically an unyielding testing device. We have a base that we take for granted is unyielding, and then we have a weight that is pretty nearly unyielding also, and we drop it on there. If a gear has any tendency to chatter as it goes in you would not hear the chattering, and would not see it. The weight will prevent your discovering the chatter, but if you have the yielding car the little yield of the car striking is just enough to leave a chatter as it goes in. It is a little different thing from what any of us in the work there anticipated because we did not appreciate that that little yield alone might allow the chatter that the solid weight won't decrease and won't detect. I think that gives a description of the test plant.

G. H. Wood (A. T. & S. F.): I understand the report of this committee is merely a report of its investigations. There is no recommendation or anything of that sort in it, and the committee is to continue their investigations along the lines of

draft gear. It is a standing committee. The gentleman said there have been no tests made to determine the pulling strength on couplers, and as that is where we have the greater part of our coupler failures, or draft gear failures I would like to suggest that if it is possible to make any tests that will determine the pulling strength in the draft gear and the draw bars that the committee try and determine the relative strength between the coupler, draft gear and knuckle parts, so that any failure that may occur will occur throughout the knuckle, knuckle pins, or those parts that can be reapplied readily, because if the knuckle and draw bar is made strong enough, and it seems to be the general opinion that it ought to be made stronger, we are simply going to pull the draft gear out of the car. We are never going to stop breaking couplers and draft gears, and things of that kind, but the committee is trying to evolve some means of reducing the failures and the shocks due to slack action. In doing this they might evolve a draw bar and knuckle parts that will give us knuckle failures instead of draft gear and draw bar failures.

Mr. Kleine: The present M. C. B. standard "D" coupler is designed to fail through the knuckle hub. It is recognized that that is the portion of the coupler which is most easily renewed. Following that up, the draft attachment should, of course, be stronger than the knuckle hub. The test for the knuckle hub now is 175,000 lb.—within the elastic limit of the cast steel—therefore, your attachment should be stronger than that, and, so far as the attachment of the draft stops to the sills are concerned, it is rather a simple matter. So far as the draft gear itself is concerned, there isn't so much trouble on the road from the failure of the draft gear as it is from the failure of the draft gear that results from the failure to properly function, and Mr. Cadel's explanation in making these road tests was simply to ascertain how a draft gear should function in order to ascertain how a draft gear should function in order to take care of the proper starting and stopping of trains.

Mr. Gaines: I was present at some of these preliminary tests at Rochester, and have seen the apparatus, and understand it to a certain extent. I think they have apparatus up there that is going to give us very definite and very fine information on draft gears when they get the whole series completed.

A motion that the report of the committee be accepted and the committee continue its work was carried.

Registration, American Railway Association, Sec. III, Mechanical

Aishton, R. H., Reg. Dir. Northwest Reg., U. S. R. A.
Akans, E. L., M. M., Osborne.
Akans, Geo., M. M., Southern, Schlitz.
Aldcorn, Thomas, Chicago Pneumatic Tool Co., Shelburne.
Allen, C. E., Gen. M. M., No. Pac., Ambassador.
Amend, D. H., Keystone Coal & Coke Co.
Anderson, J. J., M. M., Chattahoochee Valley, Osborne.
Andrews, S. B., M. E., S. A. L., Chelsea.
Aloquist, Peter, M. C. B., Pere Marquette, Ambassador.
Appler, A. B., M. E., D. & H., Marlborough.
Arden, D. D., M. M., Sav. & Statesboro, Lexington.
Armstrong, S. T., S. M. P., I. & A. N., Traymore.

Babcock, W. J., M. C. B., D. & H., Osborne.
Barker, N. M., Copper Range, Strand.
Barons, J., Asst. Gen. Car. Fore., K. & I., Osborne.
Barry, F. J., M. M., N. Y. O. & W., Chalfonte.
Bartlett, Henry, G. S. M. P., B. & M., Chelsea.
Basford, G. M., Loco. Feed Water Heater Co., Marlborough.
Bawden, Wm. M. M., Wiggins Ferry Co., Strand.
Beaumont, H. A., G. F. C. S., B. & O., Osborne.
Berg, Karl, M. E., P. & L. E., Pennhurst.
Bilty, Chas. H., M. E., U. S. R. Y. Adm. N. W. Reg., Ambassador.
Bishop, G. C., S. M. P., Long Island, Chelsea.
Blair, H. A., Supv. C. R., Allegheny Region U. S. R. R. A., Dennis.
Bohan, W. J., M. E., N. P., Ambassodor.
Boutet, H., C. J. I., Chalfonte.
Bowerson, C., M. M., Tol. & Ohio Cent., Chalfonte.
Brandt, C. A., Loco. Superheater Co., Marlborough.
Bray, B. H., S. M. P., N. O. M. & C., Osborne.
Brennan, E. J., Supt. M. P., C. M. & St. P., Marlborough.
Breyer, J. S., M. M., Southern, Dennis
Brown, E. L., C. I., Iowa Transfer Ry.
Burch, J. J., G. F. C. D., N. & W.
Burroughs, C. R., S. P., Monticello.
Burton, Thos. L., C. A. B. E., N. Y. C., Marlborough.
Bush, B. F., Reg. Dir. Southwest Reg., U. S. R. R. A.
Butler, W. S., M. M., C. & O., Marlborough.
Buzzzell, O. D., G. F. C. D., A. T. & S. F., Craig Hall.
Byram, N. E., Federal Mgr., C. M. & St. P.

Calkins, A. E., Eng. R. S., N. Y. C. Lines & Rutland, Traymore.
Caracristi, V. Z., Traymore.
Carmer, J. R., G. F., P. B. & W., Haddon Hall.
Case, S. T., M. C. B., N. Y. C., Pennhurst.
Caton, S. W., C. C. I., Western Maryland, Monticello.
Charlton, Geo. J., G. C. F., D. L. & W., Pennhurst.
Clark, F. D., Supt., Cambria & Indiana, Alamac.
Clark, F. H., Consulting Engineer, Marlborough.
Coapman, E. H., Federal Mgr., Southern
Coddington, H. W., Eng. Tests., N. & W., Shelburne.
Colgate, Thos., Litchfield & Madison, New Holland.
Combs, W. B., M. M., M. D. & S., Arlington.
Connolly, J. J., S. M. P., D. S. S. & A., Chelsea.
Coulter, J. W., M. M., Alton & So., Grand Atlantic.
Courson, J. F., G. F., Pa., Seaside.
Coutant, G. E., G. I., L. & C. D. Wabash., Alamac.
Cowgill, L., M. C. B., A. T. & S. F., Shelburne.
Cross, D. W., M. M., T. St. L. & W., Traymore.
Cunningham, J. L., S. M. P., Penn., Dennis.
Curry, H. M., S. M. P., N. P., Marlborough.

Daley, J. H., M. M., N. Y., N. H. & H., Dennis.
Davis, J. H., El. Eng., B. & O., Shelburne.
Davis, M. J., A. E. M. P., Pa., Chalfonte.
Dawson, E., M. M., Ariz. & New Mex., St. Francis.
Demarest, T. W., S. M. P., Penna., Brighton.
Deverell, A. C., S. M. P., G. N., Traymore.
De Vilbiss, E. B., A. E. M. P., Penna., Marlborough.
DeWolff, F. A., A. L. S., Cuban Central Rys. Ltd., Corinthan.
Dickinson, F. W., M. C. B., B. & L. E., Monticello.
Dinan, Arthur, M. M., A. F. & S. F., Wellington.
Ditmore, George W., M. C. B., D. & H., Osborne.
Donehue, Thos., D. G. C. F., N. Y. C., Planters.
Doring, T. J., G. F. M. C. B., Penna., Craig Hall.
Dougherty, W. Q., M. M., M. & O., Deville.
Downing, I. S., G. M. C. B., C. C. C. & St. L., Traymore.
Dunham, W. E., C. S. M. P., C. & N. W., Marlborough.
Dunkle, S. K., S. M. P., Benwood Wheel. Con. Rys., Wiltshire.
Dunlop, P. T., G. S. M. P., St. L. & S. F., Traymore.
Dyer, R. H., U. S. R. R. A., Arlington.

Edwards, H. P., G. M., A. & W., Bouvier.
Eich, H. C., G. S. M., C. G. W., Chalfonte.
Elliott, B. F., M. C. B., United Rys. of Havana, Strand.
Ettinger, R. L., C. M. E., Southern, Dennis.
Ewald, Wm., Asst. M. M., Cumb. & Pa., Monticello.
Ewing, J. J., M. E., C. & O., St. Charles.

Farr, B. J., C. M. P., G. T., Traymore.
Fisher, W. J., Midland Valley, Seville.
Fitzmorris, James, M. M., C. Junc., Lexington.
Flynn, W. H., S. M. P., M. C., Marlborough.
Foque, T. A., S. M. P., M. St. P. & S. S. M., Ambassador.
Fowler, Geo. L., C. E., Dennis.
Fox, H. K., M. E., C. M. & St. P., Ambassador.
Freeman, J. F., G. F. C. D., Sunset Cent., Strand.
Fritts, J. C., M. C. B., D. L. & W., Kentucky.
Fry, Lawford H., Standard Steel Works, Brighton.
Fryer, C. V., G. F. C. D., N. Y. O. & W., Chalfonte.
Fuller, C. E., S. M. P., U. P., Marlborough.

Gaines, F F., Vice Chrn., U. S. R. R. A., Marlborough.
Gallagher, F. S., A. E. B. S., N. Y. C., Haddon Hall.
Garstang, William, life member, Traymore.
Gemlo, William, S. M. P. & R. S., M. & St. L., Shelburne.
Goodnow, T. H., S. C. D., C. & N. W., Marlborough.
Goodwin, George S., M. E., C. R. I. & O., Chalfonte.
Gorman, J. E., Federal Mgr., C. R. & P.
Goss, W. F. M., Pres., Railway Car. Mfg. Assn., Chelsea.
Gould, Jos. E., M. M., C. H. & N., Dennis.
Gray, G. M., S. M., B. & L. E., Shelburne.
Griffith, W. C., M. M., Pere Marq., Ambassador.

Halbert, M. W., Ch. Interchange Insp., East, St. Louis, Princess.
Hall, C. C., M. C. B., Cuba R. R., Francis.

Hall, W. H., C. C. I., C. R. R. of N. J., Arlington.
Hammett, Philip M., S. M. P., Maine Central, Shelburne.
Hampton, J. N., F. C. D., A. C. L., Osborne.
Hannaford, J. M., Federal Mgr., N. P.
Hardin, A. T., Reg. Dir. East. Reg., U. S. R. R. A.
Harding, E. N., G. M. I., I. C., Alamac.
Harris, A. A., M. S., N. Y., N. H. & H. Marlborough.
Harvey, H. H., G. C. F., C. B. & Q., Chelsea.
Hatch, M. C. M., Pulverized Fuel Equip. Corp., Traymore.
Haynes, A. C., F. G. C., N. Y. C., Pennhurst.
Haynes, J. E., Montour, Chalfonte.
Hennessey, J. J., M. C. B., C. M. & St. P., Traymore.
Henry, W. C. A., S. M. P., P. Lines West, Chelsea.
Hicks, I. C., M. S., A. T. & S. F., Holmeshurst.
Hildreth, Fred F., M. E., Vandalia, Craig Hall.
Hogarth, Wm., Cudahy Refr. & Tank Lines, Haddon Hall.
Holden, Hale, Reg. Dir. West. Reg., U. S. R. R. A.
Horrigan, John, S. M. P., E. J. & E., Traymore.

Jackson, W. J., Federal Mgr., C. & E. F.
Jackson, O. S., S. M. P., C. T. H. & S. E., Strand.
Jansen, E. W., Elec. Eng., I. C., Ambassador.
Jaynes, R. T., M. M., L. & H., Chalfonte.
Johnson, J. O., Southern, Fredonia.
Jones, C. H., M. M., Hunt. & B. T. Mountain, Marlborough.
Jones, E. F., M. M., C. & W. I., Strand.
Justus, I. J., G. C. I., N. Y. C., Pennhurst.

Kantmann, A. G., G. M. M., V. S. & P., Chalfonte.
Keiser, C. B., S. M. P., Penna., Haddon Hall.
Kelley, H. G., President, G. T.
Kells, Williard, G. S. M. P., Atlantic Coast Line, Dennis.
Kelly, John P., Inspr. Safety Appl., I. C. C., Blackstone.
Kent, F. S., G. C. I., Penna., Marlborough.
Kinney, W. H., Dearbon Chemical Co., Strand.
Kinter, D. H., G. F. C. D., Monongahela, Watkins.
Kipp, A., G. C. I., N. Y. O. & W., Chalfonte.
Kleine, R. L., G. C. I., Penna., Dennis.
Kucher, T. N., M. M., T. P. & W., Ambasador.
La Mar, A., M. M., Penna., Dennis.
Laughlin, Geo. F., S. C. D., Armour Car Lines. Marlborough.
Leman, W. W., S. M. P., D. & R. G., Pennhurst.
Linstrom, C. A., C. Eng., P. A. & Mck. R., Shelburne.
Lynn, W. K., S. M. P., G. & S. I., De Ville.
Lynn, Samuel, M. C. B., P. & L. E., Pennhurst.

McBride, B., M. M., Southern, Shelburne.
McKinsey, Capt. C. R., M. M., Wash. Term. Co., Runnymede.
McMullen, John, M. S., Erie, Shelburne.
McNanamy, Frank, Asst. Dir., U. S. R. R. A., Marlborough.
McNulty, F. M., S. M. P., Monongahela Con. R. R., Chalfonte.
McQuillen, J. E., M. S., G. C. & S. F., St. Charles.
McRae, J. A., M. E., M. & St. L., Chalfonte.
Maddox, C. W., C. C. I., C. & O., Haddon Hall.
Maher, N. H., Reg. Dir. Pocahontas Reg., U. S. R. R. A.
Manchester, H. C., S. M. P., D. L. & W., Traymore.
Marden, J. E., G. F. M. P., Portland Terminal., Alamac.
Markham, C. H., Reg. Dir. East. Reg., U. S. R. R. A.
Martin T. O., Foreman, Ill. Cent.
Mehan, J. E., A. M. C. B., C. M. & St., Traymore.
Meister, C. L., M. E., Atlantic Coast Line, Dennis.
Meloy, H. C., Supt. Elec. Appl., N. U. C.
Michael, J. B., M. M., Southern, Osborne.
Miller, E. B., Super. Car Repairs, U. S. R. A., Lexington.
Miller, W. J., S. M. P., St. L. S. W., Traymore.
Milner, B. B., Eng. M. P., N. Y. C., Haddon Hall.
Milton, J. N., S. C. D., C. R. I. & P., Chalfonte.
Montgomery, Hugh, S. M. P., Rutland R. R., Dennis.
Moriarty, G. A., M. S. Lines East, N. Y., N. H. & H., Shelburne.
Moses, F. K., M. M., B. & O. Chgo Term., Osborne.
Murray, E. A., M. M., C. & O., Marlborough.
Mussey, William H., A. E. M. P., L. I., Chelsea.

Naery, J. S., M. C. B., C. I. & L., Brighton.
Nash, J. H., S. M. P., Ill. Cent., Chalfonte.
Naylor, F., M. M., Miss. Cent. R. R., Osborne.
New, W. E., M. M., K. C. Term. Ry., Monticello.
Nordberg, A., M. M., P. & S., Arlington.

O'Brien, J. J., St. L. Mer. B. Ter., Strand.
O'Brien, M. S., M. P., Traymore.
O'Brien, W. J., M. M., K. & M. Ry., Haddon Hall.
O'Dea, P. J., C. I. C. D., Erie, Pennhurst.
O'Donnell, T. J., Arbitrator, Niagara Frontier Car Insp. Assn., Pennhurst.
Onderdonk, J. R., Eng. of Tests, B. & O., Marlborough.

Perrine, W. M., M. M., C. R. R. of N. J., Grand Atlantic.
Powell, T. C., Dir. Div. of Cap. Expend., U. S. R. R. A.
Power, J. A., A. G. M., S. P., Ambassador
Powers, M. J., S. M. P. & C. D., C. C. & C. S., Ambassador.

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Ramage, J. C., Supt. Tests., Southern, Southland.
Rasbridge, R. B., S. C. D., P. & R., Dennis.
Reese, O. P., S. M. P., Penna., Chelsea.
Reid, W. L., V. P., Lima Loco. Works, Traymore.
Richardson, Louis A., M. S., C. R. I. & P., Breakers.
Ridgeway, H. W., S. M. P., Colo. & So., De Ville.
Riley, S. B., M. M., Cumb. Valley R. R., Chalfonte.
Rink, George W., M. E., C. R. R. of N. J., Traymore.
Robertson, E. J., S. C. D., M. St. P. & S. S. M., Ambassador.
Rosing, W. H. V., Globe Seamless Steel Tubes Co., Marlborough.
Russum, T. H., S. P. C. Dept., B. & O., Dennis.

Sage, R. V,. Cambria Steel Co., Marlborough.
Sandman, A. G., M. E., B. & O., Marlborough.
Schrader, J. R., C. F., N. Y. C., Osborne.
Schultheiss, Rupert, M. P. Dept., S. P., Sacramento Shop, Lexington.
Schultz, F. C., C. I. I., Grand Central Sta., Marlborough.
Schulze, R. W., S. C. D., St. L. & S. F., Traymore.
Schuyler, A. J., G. C. I., Virginia, Osborne.
Seddon, C. W., S. M. P., D. M. & N., Traymore.
Sedgewick, E. V., M. M. Ret., Inter Oceanic, Shelburne.
Seiders, I. A. S. M. P. & R. E., P. & R., Dennis.
Seley, C. A., Chalfonte.
Shackford, J. M., C. D., D. L. & W., Marlborough.
Sheafe, J. S., Shaefe Eng. Co., Dennis.
Sheahan, J. F., S. M. P., A. B. & A., Chalfonte.
Shearman, C. S., M. C. B., Chicago Jct., St. Charles.
Shoemaker, H., M. S., B. & A., Haddon Hall.
Shull, G. F., M. M., C. C. & O., St. Charles.
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Sillcox, L. K., M. C. B., Tacoma Eastern, Traymore.
Simpson, C. S., Foreman Car Dept., Cape Girardean & Northern.
Sloan, J. R., E. E. C. L., Penna., Haddon Hall.
Smith, E. W., S. M. P., P. R. R., Chalfonte.
Smith, Henry J., G. C. I., D., L. & W., Kentucky.
Smith, Jno. L., Jr., E. C. F., P. & L. E., Osborne.
Smith, A. E., M. C. B., Union Tank Line, Traymore.
Smith, Jno. L., S. M. P., Pitts. Shawmut & Nor., Osborne.
Smith, P. F. Jr., S. M. P., P. Lines, Brighton.
Smith, W. A., Traymore.
Spoor, C. E., M. C. B., B. & S., Haddon Hall.
Sprowl, N. E., S. M. P., Atl. Coast Line, Chalfonte.
Stone, A. J., Federal Mgr., Erie.
Storey, J. W., C. D., C. of G., Arlington.
Streeter, L. P., A. B. E., I. C., Ambassador.
Stubbs, G. W., M. M., Kentwood & East., Arlington.
Summer, Eliot, C. M. P., Penna., Chalfonte.
Swanson, Chas. N., Supt. Car. Shops, A. T. & S. F., Holmhurst.
Sweeley, E. H., G. F. L. R., Long Island, Chalfonte.

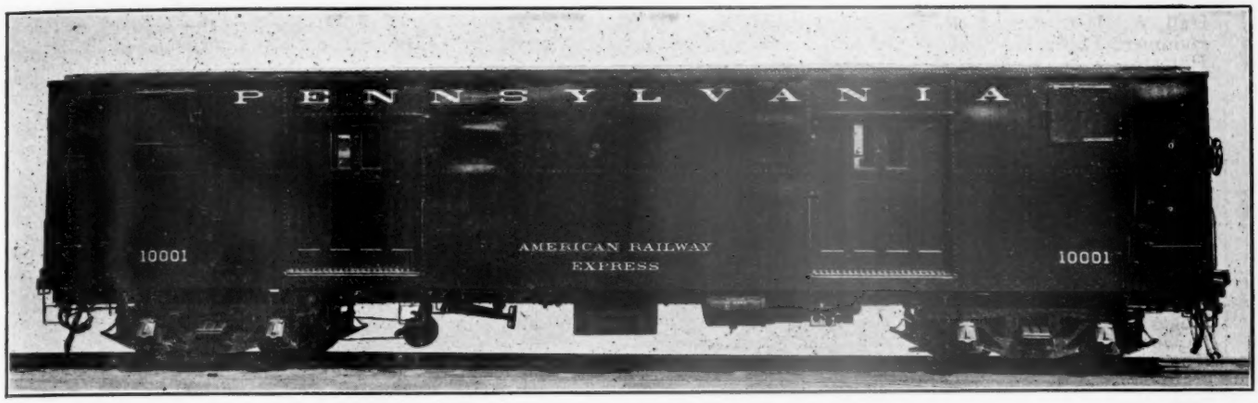
Tatum, J. J., Gen. Supv. Car Repairs, U. S. R. R. A., Chelsea.
Terrell, C. H., A. S. M. P., C. & O., Haddon Hall.
Thomas, H. T., M. M., Detroit & Mackinaw.
Thomas, J. J. Jr., S. N. P., Southern, Chalfonte.
Thompson, A. W., Acting Pres., Am. R. R. Asso.
Thompson, Geo., Oxweld R. R. Serv. Co., Shelburne.
Thompson, W. O., S. R. S., N. Y. C., Marlborough.
Thorn, W. H., M. C. B., C. St. P. M. & O., Pennhurst.
Tollerton, W. J., C. M. S., C. R. I. & P, Marlborough.
Trapnell, F. W., C. I. I., Kansas City Car Interchange Bureau, Chalfonte.
Tyler, W. T., Dir. Div. of Operation, U. S. R. R. A.

Wagoner, J. V., M. M., G. F. & A., Arlington.
Walter, P. S., C. C. I., P. C. C. & St. L., Craig Hall.
Waring, E. T., Penna.
Warnock, H. R., G. S. M. P., C. M. & St. P., Traymore.
Westervelt, Jos., M. C. B., N. Y. C., Winniefield.
Wilder, R. E., Car. Eng., Cambria Steel Co., Marlborough.
Wood, G. H., C. A. B. L., Santa Fe., Osborne.

Vittum, J. E., Chf. Joint Insp., Colwyn.

Yercy, J. P., Genl. Fore., Penna.
Young, C. B., Mgr. Insp. & Test Sec., U. S. R. R. A., Strand.
Young, J. P., G. I. P. C. E., Mo. Pac, Ambassador.

Zercher, F. B., M. C. B., G. T. W., Marlborough.

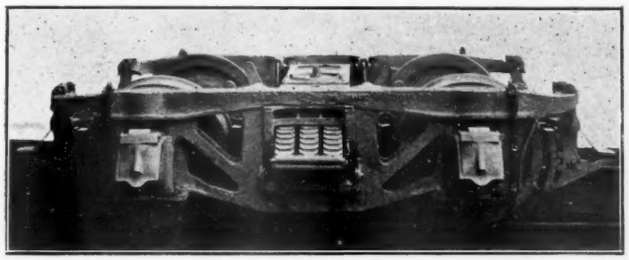


Pennsylvania General Utility Express and Baggage Car

P. R. R. General Utility Express and Baggage Car

Capacity of 70,000 lb. Obtained in Design Meeting Requirements of Universal Passenger Service.

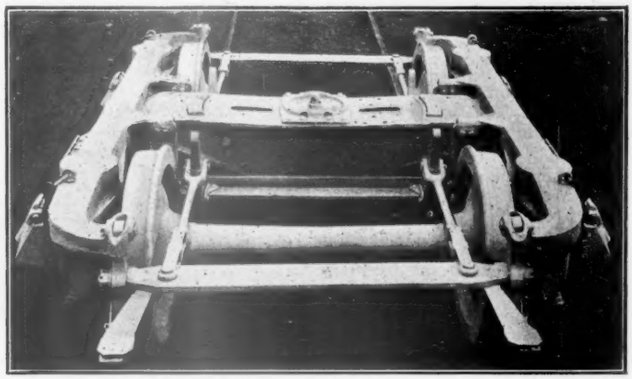
FROM AN ECONOMIC STANDPOINT one of the most interesting track exhibits this year is the Pennsylvania class B-50 general utility express and baggage car, which will be found on the Georgia Avenue tracks near the boardwalk. This car was designed primarily to handle the traffic now generally moved on the Pennsylvania in 50-ton express box cars of the X-25 class.



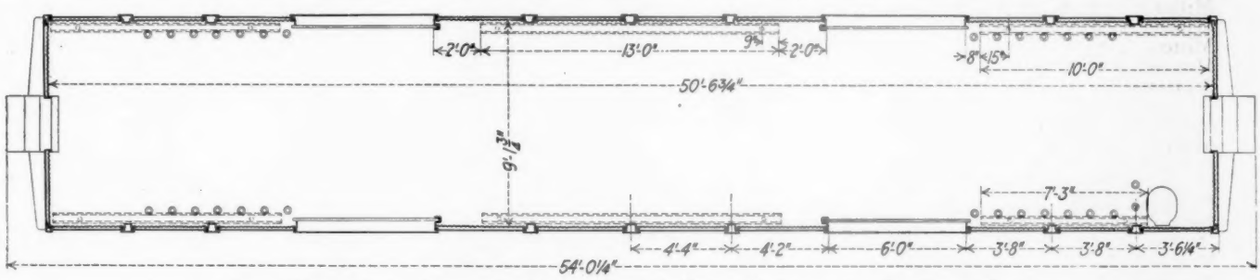
Semi-Passenger Truck for the General Utility Express Car

The design has been modified, however, to make it available for baggage, mail storage and parcels post service, as well as for some classes of perishable shipments. But while it may be pooled with other passenger equipment and moved freely in passenger service, it is much lighter, can be built for considerably less money, and has a much greater load capacity than standard passenger equipment. Furthermore, with the addition of running boards and ladders it will meet the requirements of the Interstate Commerce Commission for freight service.

While retaining a weight and first cost which are in keeping with the character of the traffic it is primarily intended to handle, the greater range of usefulness has been effected by providing two doors of suitable width of opening on each side, end doors of standard width for communicating between cars in passenger service, steam heat and electric lights, and a suitable ventilating system which may be operated from the outside when the car is moving under seal. A modified design of freight truck has been used in order to make the riding qualities of the car suitable for high speed passenger service and the car is equipped with the Westinghouse UC brakes generally used on Pennsylvania Railroad passenger equipment.



End View of the Truck



Floor Plan of the Pennsylvania General Utility Express and Baggage Car

The car has a length over buffing faces of 54 ft. ¼ in., is 9 ft. 4⅛ in. wide over the eaves and has a maximum height above the rail of 13 ft. 4⅝ in. Inside, the car is

The Interior of the Car

50 ft. 6¾ in. long, 9 ft. 1¾ in. wide and 10 ft. high at the center of the car. The trucks are 36 ft. from center to center and have a wheel base of 5 ft. 10 in. The car has a weight (estimated) of 72,000 lb., which gives it a lading capacity of about 70,000 lb., limited by the requirement that the maximum for the total load be about 140,000 lb., or 35,000 lb. per axle.

Underframe

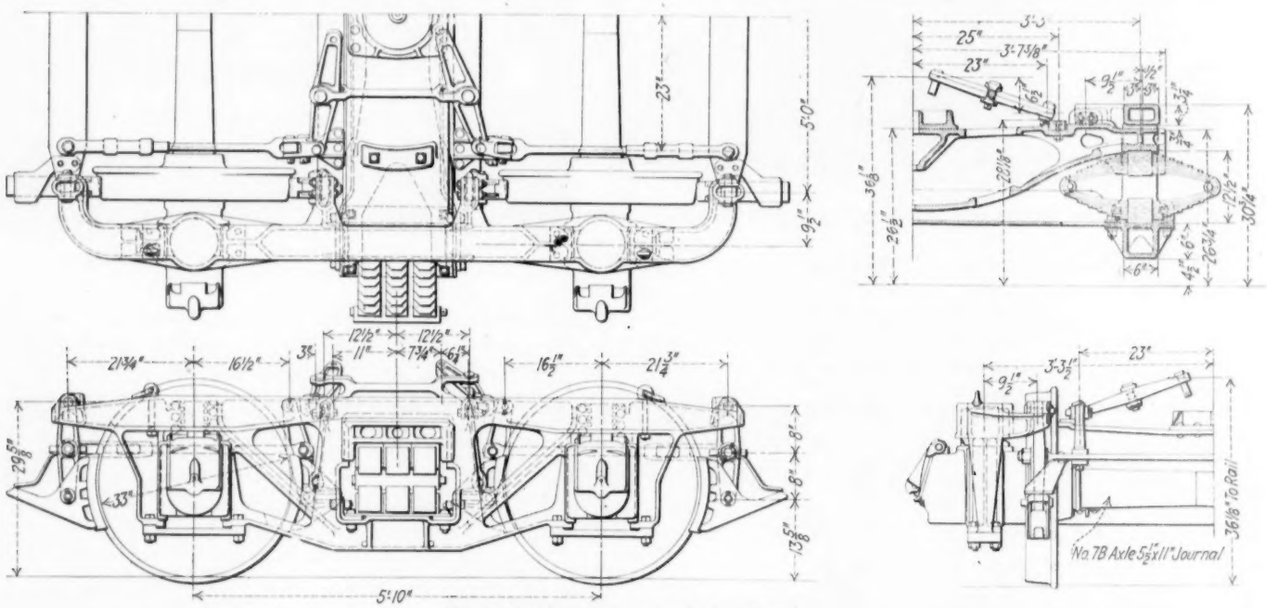
The car is built on the Pennsylvania standard steel passenger car underframe, which is of the center construction type with center sills of uniform section, in which the load is transferred to the center construction at the ends of the car and at two intermediate points between the truck centers. The center sills are 15-in., 40-lb. channels and the side sills 6-in. by 4-in. by ½-in. angles.

The Body Construction

The frame of the car body consists of corner posts of 3½-in. by 3½-in. by ½-in. angle section, end and side door posts of 4-in., 7.25-lb. channels and pressed steel intermediate side posts of U-section, flanged and riveted to the inside of the ⅛-in. side sheets. The channel openings on the outside of the posts are closed by butt strips eight inches wide and the edges of adjoining side sheets are riveted between the butt strips and the post flanges. The top member of the side frame is a 4-in., 10.3-lb., Z-bar, the outside flange of which extends down over the top of the side sheet. A belt rail of 2½-in. by 2-in. by ¼-in. angles is fitted between the side posts and riveted to the side sheets on a line 4 ft. 3⅜-in. above the floor.

The car is fitted with the A. R. A. steel box car roof, which is carried on U-section carlines and is attached at the sides to the vertical flange of the Z-bar side plates and at the ends to a pressed steel connection angle flanged over the top of the end sheet, the contour of the vertical flange of which is shaped to suit the slope of the roof.

The car has a double floor, the lower course of which is of 1¾-in. yellow pine laid transversely and secured to the top of the side sills and the top center sill cover plate by ⅜-in. carriage bolts with countersunk heads and riveted ends. The sub-floor is surfaced with ¾-in. maple flooring laid longitudinally. Drain troughs of 3/16-in. steel are let into the floor along the sides of the car, except at the door openings. Two drains open through the floor of the car from each of these troughs.



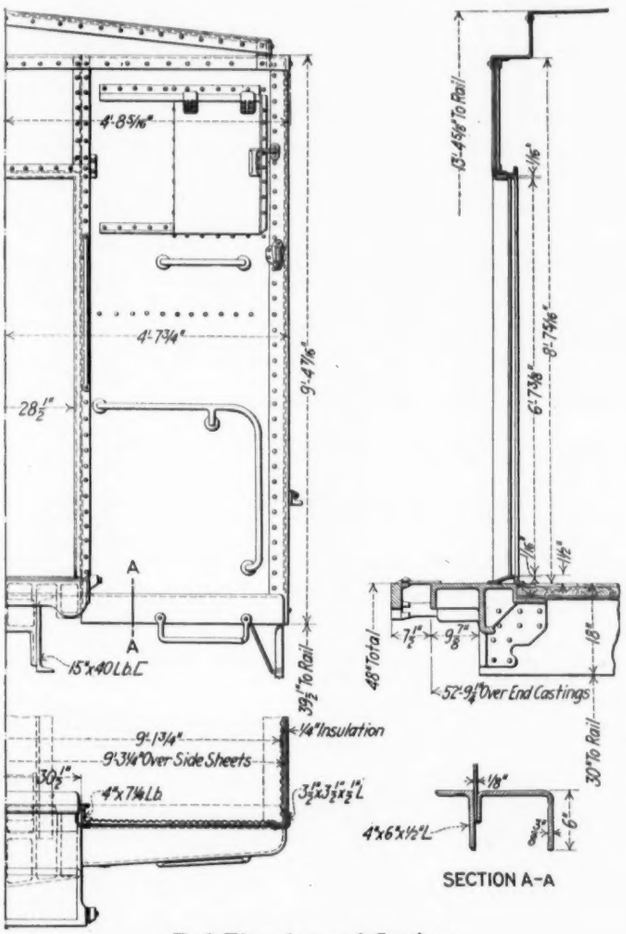
General Arrangement of the Truck

The sides, ends and roof of the car are insulated. The side and end insulation is composed of eight layers of asbestos paper, covered on each side with burlap and applied to the inside of the sheets with freight car color in a semi-paste form. Corrugated iron lining is applied inside the insulation and is held in place at the top by 2½-in. by 2½-in. by ¼-in. angles riveted to the web of the side plates, 1½-in. by 1½-in. by 3/16-in. angles fast-

ened to the floor with No. 12 wood screws and a special double angle of pressed steel fitted over and rivited to the horizontal flange of the belt rail. The roof is insulated with ground cork applied to the sheets with paint.

There are two doors on each side of the car and the center of each door opening is 13 ft. 9⅜ in. from the end of the car. The door openings are 6 ft. 0 in. wide, which is the same as for doors on standard baggage cars. The end door openings are 2 ft. 5½ in. wide. To meet the requirements of express service all doors are fitted with locks on the outside, and to suit the requirements of baggage service, are also provided with auxiliary locks which cannot be operated from the outside. In order to facilitate cleaning, the side door guards are made of one-inch wrought iron pipe.

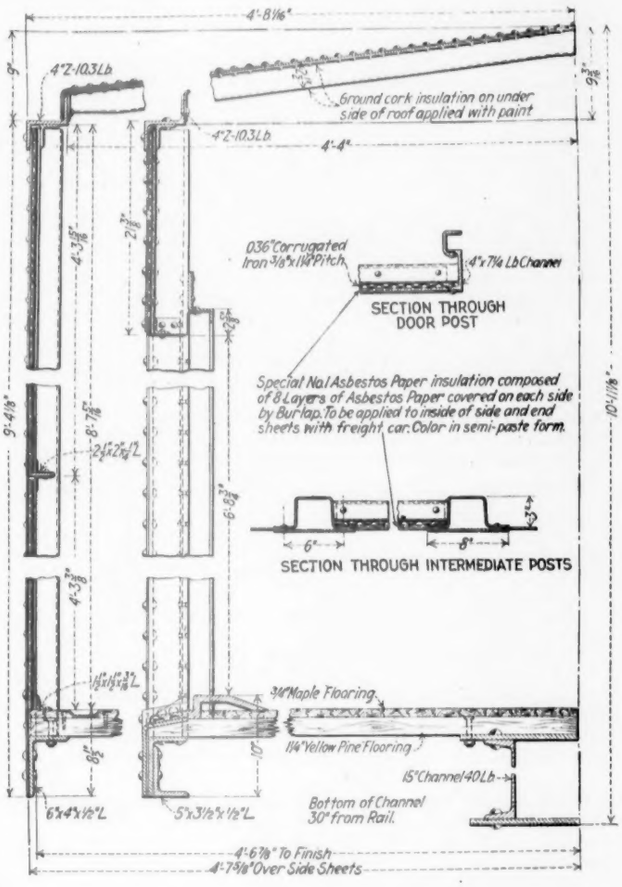
Ventilator openings are placed in the car body, one in each end and two in each side, near the corners. These openings are 15 in. wide by 27 in. high and are framed by 2-in. by 2-in. by 3/16-in. angles, riveted to the inside of the sheets, to which the ventilator frame is attached. The ventilator itself is made up of horizontal slats placed one inch apart and inclined downward and outward. A



End Elevation and Sections

heavy galvanized wire screen is placed outside of the ventilator slats and welded to the frame at the top and sides, with a ⅜-in. opening at the bottom for draining. The ventilators are closed by sliding steel doors placed on the outside of the car.

The trucks are basicly of freight car design, differing principally from freight car practice in the use of pedestals, and provision for the insertion of coiled springs between the truck side frames and the top of the journal boxes. The truck side frames are unit steel castings, the members of which are disposed in truss form. The top or compression members and the bottom members under the spring seats are of box section with coil spring pockets above the journal boxes. The two frames are connected by a flat spring plank secured to each frame by four bolts, and the load is delivered to the side frames by a cast steel bolster resting on three-unit, full elliptic springs. The wheels are 33 in. in diameter, mounted on



Details of the Car Body Construction

passenger car axles with 5½-in. by 11-in. journals, running in passenger car journal boxes. The trucks are equipped with clasp brakes and have a weight complete of 12,000 lb. each.

Five electric lights, supplied from an axle generator and storage batteries, are located along the center line of the roof of the car close to the ceilinng, in order that they may be out of the way when the car is used in express or mail storage service. The car is fitted with standard steam heat equipment, with radiators along the side of the car protected by screens and a dry hopper is provided for messenger or crew service.

This car, in point of lading capacity, comes approximately half-way between a 50-ton freight car and a standard steel baggage car, a gain of approximately 30,000 lb, in capacity being obtained over that possible in the latter. In point of cost the car also comes approximately in the middle of the range between a steel box car and the standard baggage car. A wide range of usefulness is thus provided at a cost representing a substantial saving over the amount which would be required to produce standard passenger equipment.

Special Guests

Adair, John C., Superv. of Equipment, U. S. R. R. AD., Grand Atlantic.
Agnew, S. H., M. M., River Terminal, St. Charles.
Alexander, Verne M., Purch. Agt., C. & Alton, Ambassador.
Anderson, A. W., Gen. Supt., C. & W. C. & Ga., Alamac.
Anderson, E. C., Asst. Mech. Eng., C. B. & A., Breakers.
Andrews, Henry, Asst. Gen. For., N. Y. C., Ambassador.
Arden, Morgan, M. M., Sav. & Statesboro, Lexington.
Armstrong, A. G., S. S., A. T. & S. Fe, Ambassador.
Atkinson, E. M., Agt., Penn.
Averill, E. A., Traymore.

Baker, G. T., Genl. Car Insp., P. R. R., Worthington.
Balkoff, Peter S., Asst. Chief of Russ. Miss. of Ways of Comm., Grand Atlantic.
Barstown, W. A., Pres., Union Tank Line Co., Traymore.
Barrow, Claude M., U. S. Rep., N. S. W. Gov. Rys., Traymore.
Barthlemy, R. P., A. G. C. F., G. N., Regent.
Batchelder, E. H., Jr., Secy. to Reg. Direc., U. S. R. R. A., Dennis.
Bateman, Frank, Director, A. C. R. R.
Beahm, P., F. P., Matley Tran.
Beaghen, Thomas, Jr., The Texas Co., Traymore.
Beaumont, Clifton, U. S. R. A., Traymore.
Bennett, G. R., Insp. of Locos., I. C. C., Blackstone.
Bernhardt, C. F. M., Gen. For. Car Dept., Geo., Haddon Hall.
Bettes, J. J., G. F., Georgia Central, Marlborough.
Bingham, P. R. R., Genl. Fore., Penna., Shelburne.
Boltwood, Harvey, Supt. of Equip., U. S. R. R. Assn., Haddon Hall.
Booth, C. W., M. M., N. Y., N. H. & H., Seaside.
Borland, W. P., C. Bureau Safety, I. C. C., Blackstone.
Bradshaw, J. H., Supt. Car Dept., Amer. Cotton Oil Co., Haddon Hall.
Brady, J. Frank, Asst. Super. of Equipment, U. S. R. R. A., Regent.
Brewster, E. J., G. F., C. & N. W.
Briggs, W. G., Reporter, Craig Hall.
Briggs, C. A., Asso. Phys. Bur. of Sts., P. R. R., B. & O., P. & R., Craig Hall.
Bromley, Joseph, Insp., Inter. Com. Com., Monticello.
Brown, C. W., Supt., L. & N. E.
Brown, B. S., Asst. Engr., P. R. R., Morton.
Bunn, D. M., Asst. Supt., A. C. & R. R.
Burt, A. M., Ast. Direc. of Oper., U .S. R. A., U. S. R. R., Car No. 2.
Bustch, H M., Insp. Bureau Safety, I. C. C., Blackstone.
Byrne, F., Rd. For. of Eng., Chicago Junction, Lexington.

Cair, M., Round House For., Chicago Junction, Lexington.
Callison, W. A., S. M. P., C. I. & L., Traymore.
Campbell, E. R., Chief Joint Car Insp., C. St. P. M. & O., Arlington.
Carey, J. J., Gen. Fore., L. V.
Carlton, E. T., Chief Car Insp., L. I., Strand.
Carlton, H. C., L. I., Strand.
Cartmill, L. E., Supt. Car Dept., P. F. E., Chelsea.
Case, T. G., Asst. Gen. For., N. Y. C., Pennhurst.
Caton, Frank, West Md., Monticello.
Chambers, James A., U. S. R. R. A., Dennis.
Chandler, R. L., Div. M. C., N. Y. C., Marlborough.
Cheadle, T. S., Ch. Joint Insp.,R. F. & P. R. T .
Clark, F. D., Jr., Alamac.
Clark, J. P., Sup. of Signals, Atlantic City R. R.
Clark, Milton, Storekeeper, Penn.
Coffey, J. E., Fore. Car Dept., C. R. R. of N. J., Tracy.
Coldsmith, A. C., G. F., P., B. & W.
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Coopman, E. H., Fed. Mgr., S., Ambassador.
Cooper, J. N., Sup. of Equip., U. S. R. R. A., St. Charles.
Cooper, J. W., Secy. to Reg. Dir., U. S. R. R. A., Dennis.
Corner, W. S., Power Supt., N. S. W. Rys. & Trap., Traymore.
Coyle, C. H., Asst. to Pres., Cenl. American Tank Car Co., Haddon Hall.
Crampton, John B., Eng., L. I., Strathaven.
Creel, Charles L., M. M., W. Va. North.
Creswell, R. A., Steel Expert, N. S. W. Gov. Rys., Traymore.
Crissinger, S. C., Ch. Ck., Railway Mail Service, Stevenson.
Crooks, W. B., Trav. Insp., S.
Cross, Bob, M. M., T., St. L. & W., Traymore.
Crossman, T. E., Reporter, Craig Hall.
Cunningham, W. J., Asst. Direc. of Oper., U. S. R. R. A., U. S. R. R., Car No. 2.
Daley, J. H., Gen. For., Cent. Tenn., Osborne.
Dally, F. M., G. F. L. D., C. R. R. of N. J., Lexington.
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Davis, James P.,Gen. Frt. Agt., McKeesport Connect., Galen Hall.
Davis, W. H., Office Eng., Ins. & Test. U. S. R. R. A., Shelburne.
Deal, Alonzo W., Sr., Air Brake & Mchy. Exam., P. & R., Aston.
Delcher, H. C., Insp. Test. Dept., B. & O., Martinique.
Dempster, C. M. M., Southern, De Ville.
Dewart, H. M., P. A., C. V., Arlington.
De Wolff, Frank A., Asst. Loco. Supt., Cuban Central Rwys. Lim, Corinthian.
Dick, M. M., Gen. Car Fore, C. T. H. & S. E., St. Elmo.
Dinan, Wilfred T., A. T. & S. Fe, Brighton.
Dobson, W. E., C. & I., Alamac.
Donoghue, C. H., Asst. Dir. Gen. Car For., N. Y. C., Pennhurst.
Donovan, Henry, Spec. Eng. Pur. Dept., U. P., Traymore.
Dow, A. M., Gen. Fore. Frt. Repairs, El Paso & Southwestern, Monticello.
Downes, J. H., Asst. Road Fore. of Eng., P. R. R. East Lines, Lakewood.
Drake, W. A. Asst. Mgr., Penn Tank Line, Traymore.
Dunn, George T., G. F. C. D., N. C. & St. L., Fredonia.
Dunn, Percy A., Insp. of Locos., I. C. C., Blackstone.
Durham, F. F., Genl. Insp. Car Dept., M. K. & T., Arlington.
Dwyer, Ed., Priv. Secy., Dir. of Oper., U. S. R. R. A., Marlborough.
Dyson, Admiral C. W., Bur. of Steam Eng., U. S. Navy, Craig Hall.

Edwards, James M., Secy. to Gen. Mgr., Bouvier.
Ehrich, Thomas J., Reporter, Canfield.
Elliott, B. F., M. C. B., Unit. Rys of Havana, Strand.
Epperson, J. E., Sec. to Staff Offi. Mech., Southern, Craig Hall.
Epright, A. W., Scale Insp., P., Craig Hall.
Estrud, H. H., Gen. Car Fore., C. & E. T., Arlington.
Evans, Capt. Geo. H., Southern.

Fairhead, J. E., Gen. Supt., P. & W. V., Ambassador.
Field, W. E., M. C. B., Cent. of Geo. Arlington.
Fineron, F. W., Fmn. M. P. Dept., St. Elmo.
Fisher, H. B., Asst. Pur. Agt., P. A. & M. Ck., Traymore.
Fitzgerald, L. C., C. S., Erie, Shelbourne.
Fitzgerald, M. E., M. C. B., C. & E. I., Arlington.
Flowers, S. R., F. C. D., A. C. Line, Terminal.
Ford, J. H., G. C. F., L. & N. E.
Fuller, W. W., Safety Supt., Seaboard Air Line, Dennis.

Gainey, J. J., Gen. For. Rep., Southern, Chalfonte.
Gallagher, P. F., Foreman B. M., State Island R. T., Williams.
Garman, Delbert, Insp. Bureau Safety, I. C. C., Blackstone.
Gearhart, J. H., Secy. to Reg. Dir., U. S. R. R. A., Marlborough.
Gee, H. E., For. Mech. Eng. Office, Penn., Morton.
Geisking, Charles, Gen. Fore., P.
Gemlo, Wm., S. M. P. & R., S. M. St. L., Shelburne.
Gilbert, J. B., Jr., Asst. Eng. House For., W. J. & S. S.
Gilbert, J. B., Sr., W. J. & S. S.
Gimpel, Julius H., S. C. R., U. S. R. R. A., Strand.
Goff, C. G., M. M., Ga., So. & Ha.
Good, Harold, M. C., Shelburne.
Gorbounoff, Simon T., M. E., Communications, Grand Atlantic.
Griffith, H. C., Insp. Office of Mech. Engr., P. Eastern Lines, Borton.

Hadley, E. A., Eng. Asst. to Reg. Dir., So. West. Reg.
Hair, John, Special Eng., B. & O., Clarendon.
Hale, O. R., M. P. Supt., Western & Cuban Central, Marlborough.
Hammond, F. S., Gen. Strkpr., Pgh. Shawmut & Nor., Osborne.
Hankey, Elmer B., Chf. Clk., P., Craig Hall.
Harbert, W. F., C. C. & M. C. B., Indiana Harbor Belt, Orborne.
Harlow, E. H., M. M., A. T. & S. F., Arlington.
Harper, F. J., Gen. Car Insptr., Frisco, Strand.
Harper, E. L., M. C. B. Acct., Northwest Pac., Grand Atlantic.
Harris, R. C., Genl. Store, P. Lines West, Traymore.
Hardie, J. S., Genl. Fore. Car Dept., K. C. M. & O., Belfort.
Hay, J., M. M., G. T. R., Wiltshire.
Hayes, C. J., Asst. Eng., N. Y. C., Dennis.
Helwig, P. W., M. C. B., C. & A.
Hengstler, D., Fore., P., 143 S. Illinois Ave.
Herrold, A. E., M. C. B., Monongahela Connctg., Philip House.
Herring, W. M., Ch. Ck., So., Arlington.

Heslin, H. W., M. M., N. O. Ct. No., De Villa.
Hickok, W. H., Ch. Insp. Car Dept., D. & H., Osborne.
Hill, F. J., Chief Elec., M. C., Traymore.
Hill, A. T., Gen. Frt. Agy., Lake Term., Galen Hall.
Hitch, C. M., M. C. B., B. & O., Osborne.
Holzemer, J. F., P. A., T. & O. C., Traymore.
Hood, J. M., Supt., Akron Canton & Youngstown, Kenderton.
Hoover, G. W., M. C. B., Texas So. EastM., Osborne.
Hope, P., Gen. For., C. V., Osborne.
Howell, H. T., M. S., C. V., Arlington.
Hubbell, C. C., P. A., D., L. & W., Traymore.
Hughen, J. M., M. C. B., P. Tank Lines, Traymore.
Hummel, Herman H., C. C. to Gen. S. M. P., S. P., Shelburne.

Ingersoll, Howard L., Mech., Asst. to Reginal Dir., N. Y. C. Lines, Traymore.
Irving, H. R., Sup. Test Dept., B. & O, Martinique
Irwin, J. E., M. M., Sand Springs, Continental.

Jackson, W. J., Frd. Mgr., C. & E. I., Ambassador.
Jackson, John R., M. E., U. S. R. R. A.
Jellison, B. T., Pur. Agent, C. & O., Marlborough.
Jett, Emery E., M. C. B., Morris & Co.
Johnson, B. P., M. M., Nor. Pac., Ambassador.
Jones, James E., Insp. of Safety, I. C. C., Blackstone.
Jones, W. H., Supr. R. R. Repairs, Chalfonte.

Kadell, B. W., Asst. Eng. Insp. Test., U. S. R. R. A., Monticello.
Kane, John P., Supr. of Equip., U. S. R. R. A., Regent.
Kapp, J. B., M. M., P., Grand Atlantic.
Kauffman, G. B., Inst. Pass. Train Employees, P. & R.
Keiber, Henry, Asst. For., P. & R., Elberon.
Kells, Paul, A. C. L., Dennis.
Kendall, W. C., Mgr. Car Service Dept., U. S. R. A.
King, John H., C. C. M. of W., N. Y. & W., Philip House.
Kirk, J. W., U. S. R. A., Lexington.
Kleinhaus, F. J., Car. Acc., Interstate Tank Car Corp., Chelsea.
Koeneke, Thos. B., Supt. Equip., Indianoma Refining Co., Strand.

Laughlin, Geo. C., Amour Car Line, Marlborough.
Lambeth, G. L., M. M., M. & Q., Alamac.
Langzettel, W. S., Mech. Eng., The Central, Alamac.
Leflot, C. H., Rep. Engineer, Paris-Orleans Ry., French High Comm., Pennhurst.
Leslie, B. J., Draftsman, Penn.
Levan, Frank J., M. P. Clerk, L. I., Alamac.
Lewis, Herbert, Loco. Inspr. Bur., I. C. C., Blackstone.
Lower, M. J., Asst. Genl. Mgr., O. R., Traymore.
Lumley, Charles, Estimate Engineer, C. St. M. & O., Pennhurst.

McAlpine, J. D., Acc., N. Y. C., Pennhurst.
McBrian, Jas., Dist. Car Insp., C. R. T. & Pac., Lexington .
McClennan, W. J. Asst. Eng. R. S., N. Y. C., Dennis.
McGinty, Geo. F., Secy. Inter-Com. Com., Blackstone.
McLaughlin, M. C., Loco. Insp., B. & M., Seaside.
McMillan, A., Supt. Car Service, Morris & Co., Traymore.
McNamara, James F., Secy. to Reg. Dir., U. S. R. R. A.
McNicoll, Chas., D. F. A., Pencoyd & Phila., Galen Hall.
Mallard, J. T., M. M., Norfolk So., Monticello.
Mallory, C. E., Supt. & Traf. Mgr., Kingan Refrig. Line, Traymore.
Manley, W. J., Car Service Section, U. S. R. A., Pennhurst.
Martin, Livingston, Ch. M. C. B., B. & O., Wiltshire.
Marriott, Geo. A., Corp. M. Mech., C. & O., Grand Atlantic.
Mase, C. F., Super. Car Repair, U. S. R. R., Adm., Avon.
Mathews, Woodrow, A. C. L., Revere.
Mattingley, E. H., Gen. Car For., B. & O., Osborne.
Maurer, W. R., Engr. of Equip., N. Y. N. H. & H., Haddon Hall.
Mayer, Frank A., Gen. M. B. M., Southern, Arlington.
Mendenhall, D. H., Gen. For., Wheeling Term., Castro.
Merrill, A. J., Sec., So. & So. West., Arlington.
Michael, H. C., Secy. to Eng. of Tests, B. & O.
Mills, A. N., Insp. Test Dept., B. & O., Arlington.
Miller, Robert N., Asst. Eng., Penn., Morton.
Miller, R. E., U. S. R. R. A., Lexington.
Mitchell, A. G., Supt., P. R. R. & W. J. & S. R. R.
Mitchell, E. B., Div. Frt. Agt., Penn.
Mitchell, P. H., Car Fore., M. D. & G., Osborne.
Moir, George B., Asst. Supt. Equip., U. S. R. R., Haddon Hall.
Moncure, A. H., Gen. Fore., Car Shops, R. F. & Pot.
Moody, F. C., Sup. S. R. Car Reps., U. S. R. R. A., Chelsea.
Morrison, William, Storekeeper, L. I., Regent.
Morris, J. C., Fore. Car Shop, Cumb. Valley, Chalfonte.
Morris, R. L., Gen. Store., C. & O., Craig Hall.
Morris, R. T., Jr., C. & O., Craig Hall.
Moses, E. P., Genl. Car Insp., N. Y. C., Dennis.
Mueller, J. R., Pur. Agt., Hocking Valley, Chalfonte.
Munay, G. E., Mech. & Ele. Eng., G. T., Marlborough.
Murrian, W. S., Ry. Board of Adj., Lexington.

Nicholas, R. H., Asst. M. M., C. R. R. of N. J., Lyric.
Nordberg, C. R., Spec. Apr., Pen., Arlington.
North, L. A., Shop Supt., I. C., Sterling.

Ogilrie, James, Mch. Expert, G. T., De Ville.
Oliver, C. E., Genl. Car. For., Santa Fe, Osborne.
Otto, Alfred, Clerk, N. Y. C., Marlborough.
Owen, W. F., Genl. Mgr., A. M. & West., Osborne.

Pack, A. G., Chief Insp., Bur. Loco. Insp., Inter. Com. Com., Blackstone.
Parrish, J. B., Genl. Mgr., C. & O., Breakers.
Patram, B. F., Gen. For. Car Repairs, So., Elberon.
Patterson, F. M., Of. of Dis. Dir., U. S. R. R. A., Haddon Hall.
Perry, M. R., Chief M. C. B. Insp., B. & O., Bouvier.
Pfeiffer, I. F., Spec. Eng., Penn.
Phelps, W. C., Pur. Agt., P. Western Lines, Traymore.
Pole, Thos. C., Engineer, D. R. & W.
Porter, C. A., Supt. Transp., Indian Refining Co., Traymore.
Porth, H. W. L., M. C. B., Swith Ref. Trans. Co., Blackstone.
Pournall, W. A., M. E., Wabash, Alamac.
Prettyman, A. J., F. C. D., N. Y. C., Craig Hall.
Priest, Harry M., Insp. of S. A., I. C. C., Blackstone.

Quinn, M. H., Gen. Fore., Erie, Pennhurst.

Reid, W. G., M. M., Ariz. East, Strand.
Ramage, Master Cowan, Southland.
Ranck, Capt. J. M., U. S. Army, Runnymede.
Reed, W. M., Secy. to Frt. Agt., Atlantic City & Pleasantville, Pleasantville, N. J.
Reed, H. A., Yardmaster, B. & W. C., Wiltshire.
Reed, M. R., Supt. of Car Reps., Penn., Craig Hall.
Reice, John, Insp. Tools & Mach., N. Y., N. H. & H.
Rice, N. W., Engineer, S. P. & S., Ambassador.
Richardson, Louis A., Jr., C. R. I. & P., Breakers.
Rivett, R., Supt. Car Repr., U. S. R. R. A., Chelsea.
Roberts, Mord, Retired, Kansas City So., St. Charles.
Robertson, H. M., S. S., N. P., Ambassador.
Robinson, T M., Ch. Draft., Hocking Valley, Chelsea.
Rogers, A. D., Insp. Buy. of Loco., I. C. C., Blackstone.
Romanach, Juan A., S. of L., Cuba Cane Sugar Corp., Dennis.
Rommel, C. T., G. M. P. I., B. & O., 125 S. Illinois Ave.
Ross, B. B., Gen. For. Car Dept., L. I., Regent.
Ryan, J. W., G. C. I., C. St. P M, Pennhurst.

Sale, C. S., Asst. to Pres., Railway Car Mfg. Assn. ,Chelsea.
Samuels, W. H., Gen. For. Car. Dept., Frisco, Strand.
Sandhas, H. L., Gen. Insp., C. R. R. of N. J., Schlitz.
Scheifele, John, R. F. of E., P. & B., Ariel.
Schjerning, E., Insp. Eng., Danish Sate Railways, Marlborough.
Schlatter, L. H., Asst. Fore., P.
Schneider, Louis, Asst. Ch. Clk. to S. M. P., G. N., Grand Atlantic.
Scofield, W. C., For. Blacksmith, I. C., Sterling.
Scott, J. R., M. I., Frisco, Osborne.
Shank, A. B., G. F., M. K. & T., Belmont.
Shaw, O. E., M. C. B., Wilson Car Lines, Monticello.
Sheehan, J. J., Tool Fore., N. & W., Louella.
Sheen, John, M. C. B., Atla. & West Point, Osborne.
Shirley, John A., Ass. Ch. Insp. of Loco., I. C. C., Blackstone.
Simms, H. A., M. S. C. E., Am. R. Ex. Co., Chalfonte.
Sipes, W. C., C. & I., Alamac.
Skilling, John K., Acc., U. S. R. R. A., Monticello
Slutzker, Joseph, M. M., P. Lines East.
Smith, J. C., Supv., A. C. & S.
Smith, J. H.
Smith, Montgomery, A. P. A., P.
Smith, R, M. M., Union, Neville.
Snyder, Joseph, M. M., Monongahela, Osborne.
Sowman, Commander Roy S., U. S. Navy, Shelburne.
Stapleton, J. F., Pur. Agt., H. I. D., Strand.
Stevens, F. J., M. M., A. & C. & S.
Stewart, A. B., Ry. Tr. For., C. R. I. & P.
Stone, Walter C., Supr. Car. Repairs, U. S. R. R. A, Chalfonte
Storke, C. H., Supr. of Loco. Maint., U. S. R. R. A., Traymore.
Sutherland, T M., Gen. Car For., Santa Fe, Los Ang., Holmhurst.
Summers, E. P., Gen. Fore., S. P. R., Grand Atlantic.
Sweeny, U. S., Asst. Ch. Ck., Supt. M. P., Wash. Southern.
Sweringen, F. H., The Streets Co,. Alamac.

Tapman, W. H., Gen. Mech. Insp. Test D., B. & O., Arlington.
Titus, T., Asst. Eng. M. P., Penn. W. L., Dennis.
Thomas, William, 111 Albion Place, Atlantic City, N. J.
Thompson, E. B., Asst. Eng., C. N. & W., De Ville.
Thorn, Willis W., C. St. P. M. & O., Pennhurst.
Thorne, Clifford, Rep. Tank Car Owners, Traymore.
Thornley, E. W., Reg. Supv. of Stores, Allegheny Reg.
Tierney, James E., M. M., L. & A., Sterling.
Tiley, Geo. E., Supt. Tank Car Equip., Crescent Tank Line, Lexington.
Tollerton, Robert W., C. R. I. & P., Marlborough.
Tolley, Geo. H., Insp. Locos., I. C. C., Blackstone.
Trottnow, E. H., Assr. Gen. For., N. Y. C, Ambassador
Turner, J A., P. A., Mobile & Ohio, Brighton.
Tutt, T. I., Mgr., P. Tank Lines, Traymore.
Tyler, U. T., Dir. Div. of Oper., U. S. R. R. Ad., Marlborough.

Villard, George, Mgr., Amer. R. R. of Porto Rico, Traymore.
Voigt, Jake, Pur. Dept., P.
Vollmer, W. G., Asst. Reg. Dir., U. S. R. R. A.
Vought, Harry D., Secy., N. Y. R. R. Club & Central R. R. Club, Marlborough.
Vyne, A. G., For. Eng. House, W. J. & S. S., Worthing.

Waddy, G. N., Gen. Car Fore. Lines, West, Erie.
Wagar, Walter F., Bureau of Safety, I. C. C., Blackstone.
Walker, J. N., Carman, C. R. I. & P.
Walker, J. W., A. B. & S. H. Insp., Penn.
Walker, J. J., Secy. to Reg. Dir., U. S. R. A., South. Reg., Ambassador.
Walsh, C. E., Asst. Pur. Agt., Penn. L. W., Traymore.
Warne, C. C., Asst. Pur. Agt., N. Y. C., Marlborough.
Warner, W. W., S. S., Erie.
Welsh, John, Dist. Insp. of Loco., U. S. R. R. A., Blackstone.
Whaley, T. H., Boilermaker, W. J. & S. S.
White, E. E., Gen. Car Insp., P. R. R., Craig Hall.
Wightman, F. A., Reg. Supt. of Safety, U. S. R. R. A., Blackstone.
Wilbur, R. H., Gen. Mgr., L. & N. E.
Williamson, C. H., For. Of. Gen. Sm. P., P. R. R., Morton.
Williamson, G. B., M. C. B. Insp., Bouvier.
Wilson, C. A., Asst. M. M., W. J. & S. S.
Wilson, H. A., Secy. & Mec. Asst., U. S. R. R. A., Dennis.
Wilson, H. A., A. R. M. Allegheny Reg., U. S. R. R. A.
Wilson, O. A., For. Car Insp., Keystone Coal & Coke, Traymore.
Winchell, B. L., Reg. Dir., Southern, Ambassador.
Withall, Arthur, Asst. Eng. Car Const., A. T. & S. F., Alamac.
Wood, D., Asst. M. E., S. P., Shelburne.
Wood, C. W., Supvr. P. C. W. K., M. C., Shelburne.
Woods, G. D., Supt. Car Plant, Santa Fe, Osborne.
Woods, J. G., Pur. Agt., M. C. & St. L.
Woodward, C. N., Gen. Supt., N. Y., N. H. & H., Dennis.
Woodworth, E. A., U. S. R. R. Adm., Arlington.

Yeager, J. R., Genl. Fore., West Maryland, Monticello.
Yergy, H. J., Gen. Car Inspr., P., Northwest, Craig Hall.
Yong, James, Pur. Dept., P.
Young, F. W., Genl. Boiler Insp., C. N. & St. P., Schlitz.

Zane, W. H., A. B. I., W. J. & S. S.
Zartman, S. B. Supt. of Safety, P. & R.

MONEL METAL is an alloy of 60 per cent nickel, 38 per cent copper and a small amount of manganese or aluminum. It is tough and ductile and can readily be machined, cast, forged, annealed, rolled, soldered, brazed and welded. Monel metal is sold in rods, sheets, tubes or in cast form. It is used for parts requiring great strength, hardness and incorrodibility, such as pump liners, valve seats, bolts, studs, shaft nuts and caps, nails, screws, chains, etc.—*Machinery.*

BEEHIVE OVENS.—The continued existence of the wasteful beehive coke oven, said Secretary of Commerce Redfield recently, ought to be an offense against accepted business standards, just as higher business standards, will some day think it an economic offense to allow black smoke to escape from a chimney for lack of careful firing.

Conventionalities

Mrs. Michael Quinn and sister, Miss Carroll, of Port Jervis, N. Y., are attending the convention with Mr. Quinn, who is general foreman car repairs of the lines East, Erie Railroad.

Juan Etenderson, General Locomotive Inspector, United Railways of Havana, and Juan Romañach, Superintendent of Locomotives and Cars, Cuba Cane Sugar Corporation, Havana, Cuba

Did you ever see a broader grin than that on the face of Walter Johnson? There must be a reason and—we have it! Walter has been made assistant manager of the pneumatic tool sales of the Ingersoll-Rand Company.

F. W. Sargent, chief engineer of the American Brake Shoe & Foundry Company, was in action early. He has been in the ring at these conventions for more years than he will tell, but he still has the punch and the smile.

H. S. Irving and H. C. Delcher, Inspectors, Test Department Baltimore & Ohio Railroad

Ben Elliott, master car builder of the United Railways of Havana, Havana, Cuba, arrived Thursday with Mrs.

Elliott. They are registered at the Strand. Neither can vouch for Hale, reported overdue in yesterday's *Daily*.

George Musgrave is introducing his son, Howard G. Musgrave, who has recently been released from the Naval Aviation Corps. Mr. Howard Musgrave is joining his father in the service of the Star Brass Manufacturing Company.

E. E. Griest, formerly master mechanic of the Pennsylvania Lines at Fort Wayne, Indiana, and now assistant general superintendent of the Chicago Railway Equipment Company, is attending the conventions. He is quartered at the Traymore.

Frank Morrison, of the Mason Regulator Company, who has been prominent in past years in R. S. M. A. Committee work, has brought with him this year his daughter, Miss Lavinia. This is Miss Morrison's first visit to these meetings.

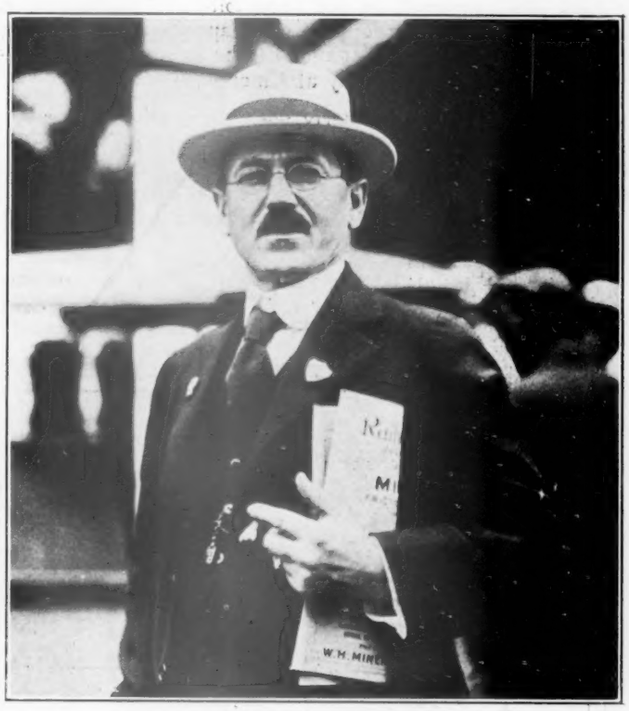
Frank De Wolff, assistant locomotive superintendent, Cuban Central Railway at Sagua La Grandé, Cuba, who is stopping with friends here, wishes to deny the fact that Sagua is not on a railroad. He states that it is on a good railroad and that the custom of the country is his —"my house is at your disposal."

Thomas L. Mount, who, for seventeen years, has attended these meetings as a representative of the Consolidated Railway Electric Lighting & Equipment Company, has, since May, been attached to the Electric Storage Battery Company, of Phildaelphia. Mr. Mount is one of the pioners in electric lighting for railway coaches.

Twenty-four hours late but still smiling, Colonel Savage, vice-president of the Pulverized Fuel Equipment Corporation, and party "blew in" to the Traymore Wednesday evening. It is whispered that "Old Maude," the Colonel's 'benzine buggy" balked somewhere up the road when she found she was to travel all the way from New York to Atlantic City on pulverized fuel.

J. Snowden Bell, who has been a regular attendant at the conventions for many years, will be unable to attend this year. Several weeks ago he fell on the postoffice steps in Pittsburgh, Pa., breaking his leg near the hip. He is still confined to the Western Pennsylvania Hospital in Pittsburgh, but is getting along very well and expects to be moved to his home within a short time

Burton Mudge, president of Mudge & Company, was an early arrival at the convention. Mrs. Mudge accompanied him but Burton, Jr., who has also been a consistent "conventioner," was forced to stay home to ponder



C. C. Hall, Master Car Builder, Cuba Railroad, Camaguey, Cuba

over college examinations. He expects, however, to arrive later in the week. Father and son Mudge are becoming a formidable golf team, and while no challenges have been issued, accompanying golf bags show preparedness to defend a good golfing reputation.

Compelled to remain at home on account of the illness of his wife, William O. Duntley, president of the Duntley-Dayton Company, regrets his inability to attend the conventions this year. He had made all arrange-

Left to right—Mrs. W. W. Lemen and Miss Catherine Lemen, wife and daughter of W. W. Lemen, Superintendent of Motive Power, of the Denver & Rio Grande. Dan Cunningham, Assistant Superintendent of Motive Power, D. & R. G., and R. H. Dyer, Supervisor of Car Repairs, U. S. R. A., Washington, D. C.

ments to be here. Vice-president Crawford A. Duntley, a son, will arrive Saturday. George Bardon, manager of the Philadelphia territory, is here, but this year Mrs. Bardon could not attend.

L. W. Schnitzer, of the Ingersoll-Rand Company, is attending the convention in a new capacity this year. He has just been made manager of the pneumatic tool department of that company at Chicago.

Chas. W. Allen, formerly with the motive power department of the Philadelphia and Reading and who later entered the supply field with L. J. Bordo, died at Reading, Pa., June 11th. Mr. Allen was the son of Geo. S. Allen, retired, who was master mechanic of the Philadelphia & Reading at Tamaqua, Pa.

Karl J. Eklund, who has attended all the conventions since 1910, is here this year with Mudge & Company, of which company he is general manager. He was formerly

R. S. Mounce, General Foreman Car Repairs, Erie, and J. T. Munroe, Shop Superintendent, Erie

associated with the Pilliod Company and is still representing its interests. Mudge & Company being western representatives for the Pilliod Company.

J. H. Gimpel, a supervisor of car repairs for the railroad Administration, with headquarters at Denver, Col., is accompanied by his wife and his oldest daughter, Bertha. It is hard to believe that Mrs. Gimpel is the mother of nine daughters. Mr. Gimpel reports that the crop conditions in the West are splendid and that the roads are rapidly getting their car equipment into shape to take care of the heavy traffic which will soon be upon them.

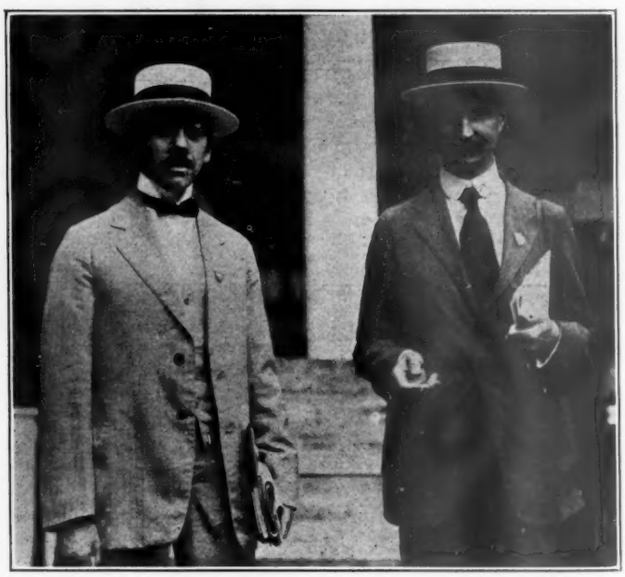
J. H. Killius, of the Baker R. & I. Company, gave a splendid account of himself on the Million Dollar Pier last week. When the congestion of express and parcel-post packages became acute he generously offered the use of his general utility industrial truck and delivered a large volume of material to the booths each day.

Frank T. Hyndman, who is now living at Cleveland, and who was associated with the Procurement Division of the War Department during the war, motored to Atlantic City with Mrs. Hyndman. He expects to remain here over Saturday and will then return to Cleveland, going back by a northern route which will carry him through New York and northern Ohio.

Fred S. Wilcoxen, a long-time convention attender, will be missed this year by his many friends. He is unable to attend this convention on account of his duties with the Fuel Conservation Section of the Northwestern Regional Director's Office. He has attended each year since 1910, having been connected with the Service Department of the Pilliod Company in the Western territory.

The Chicago, Milwaukee & St. Paul delegation this year includes two eastern railroad men who since the last convention have followed Horace Greeley's advice. They are H. R. Warnock and E. J. Brennan, who left the Western Maryland and the Baltimore & Ohio about two years ago. Contrary to the general belief Mr. Warnock and Mr. Brennan say they are not worrying about a surplus of locomotives and cars on the Milwaukee after July 1.

Nothing but an extremely important appointment could keep Robert F. Carr, president of the Deerborn Chemical Company away from the conventions. Unfortunately, the date of the convention this year conflicts with the commencement exercises at the University of Illinois. Mr. Carr is president of the board of trustees of that university which this year, will graduate more than 600 students. His duties in this connection make it absolutely necessary for him to be in Champaign.



P. Balkoff, Assistant Chief, and (Right) S. Gourbonoff, Chief Inspector, Russian Mission of Ways and Communications

Mr. and Mrs. D. C. Noble are again at the Marlborough-Blenheim. Mr. Noble, who is president of the Pittsburgh Spring and Steel Company, has been attending these conventions for upwards of thirty years. It is only natural that he takes considerable pleasure in the

ever-growing success of the meetings, since for many years he was very active in the management, having at one period been treasurer of the Railway Supply Manufacturers' Association.

J. E. Mechling, superintendent of motive power of the St. Louis system of the Pennsylvania Lines West ,with headquarters at Indianapolis, Ind., brings the regrets of W. C. Arp, former superintendent of motive power of the same lines, for his inability to attend the convention for the first time in years. Mr. Arp's host of friends will be sorry to learn of his indisposition and inability to be here this year. Mr. Mechling is accompanied by Mrs. Mechling and Miss Lois, their daughter.

It is good to see J. C. Currie on the pier. His railroad friends have missed him during recent months because of the fact that he retired from the Nathan Manufacturing Company sometime ago. The pull of the conventions, however, was too strong for him to resist, and he is attending as a guest of the Nathan Company. Mr. Currie has always taken an extremely active part in the affairs of the Railway Supply Manufacturers' Association and

Sam Andrews, Mechanical Engineer, Seaboard Air Line

was chairman of the Finance Committee of that organization at the 1916 convention.

William Owens, representative of the New York Air Brake Company at Buffalo, is at the Chalfonte. Mr. and Mrs. Owens have been attendants at these conventions for years and their many friends will learn with regret of Mrs. Owens' death about two months ago. Mr. Owens holds the distinction of being one of the engineers who took the Black Diamond over her maiden trip in May, 1897, his run being from Sayre to Buffalo. He has been with the New York Air Brake Company continuosly since January, 1900, except for two years (1910-1912), when he was general air brake fuel inspector on the Lehigh Valley. He is also one of the charter members of the Traveling Engineers' Asociation and has attended its convention for twenty-five years.

Frank W. Furry, president of the Ohio Injector Company, who had been attending the conventions for years, died at his home in Chicago recently. It had been Mr. Furry's custom for a long time to come to Atlantic City on the Special from Chicago, and he followed the pleasant practice of providing himself with some fine California cherries which he passed around on the train.

William S. Furry, his son, who was asosciated with him in business and who has now succeeded him as presi-

Andrew Chambers, Veteran Engineer, Pennsylvania Railroad

dent of the company, continued his father's custom on this year's Special, and the crowd received its cherries as usual. The elder Mr. Furry had many friends among those who attended the conventions, who have greatly regretted to hear of his death.

Mr. and Mrs. W. T. Tyler, accompanied by their nieces, Misses Lucile and Veronica Ermatinger, arrived Wednesday evening, and are at the Marlborough-Blenheim. Mr. Tyler is director of operations of the Railroad Administration. The Misses Ermatinger are daughters of George A. Ermatinger, brother of Mrs. Tyler, who is connected with the mechanical department of the Railroad Administration, and who already was here at the convention. Mr. and Mrs. Tyler and their party paid their first visit to the exhibit on Wednesday evening, and were interested spectators. They probably will remain at least until Saturday, as Mr. Tyler is very anxious to give the exhibit a thorough inspection. The Tylers' only son, Harold, entered the United States Navy as a lieutenant when this country became involved in the war, and is now on the ship Mongolia, which is said to have made more trips carrying American troops and to have brought more troops home than any other ship. Mr. Tyler was greatly impressed by the attendance at the convention and by the magnitude and importance of the exhibit, and he is a good judge of anything pertaining to railroads, as he has been in the business ever since his youth, and rose from the ranks through all the grades of the operating department.

New Devices Among the Exhibits

Red Devil Pneumatic Rivet Cutter

THE RED DEVIL RIVET CUTTER shown by the Duntley-Dayton Company is a pneumatic tool designed solely to cut and back out rivets. The principle is simple—that of a plunger in a long barrel, driven by compressed air, striking a blow on the chisel head. It

The "Red Devil" at Work

will cut cold 1¼-in. rivets in an average of ten seconds, and 1-in. rivets are cut in from three to five blows.

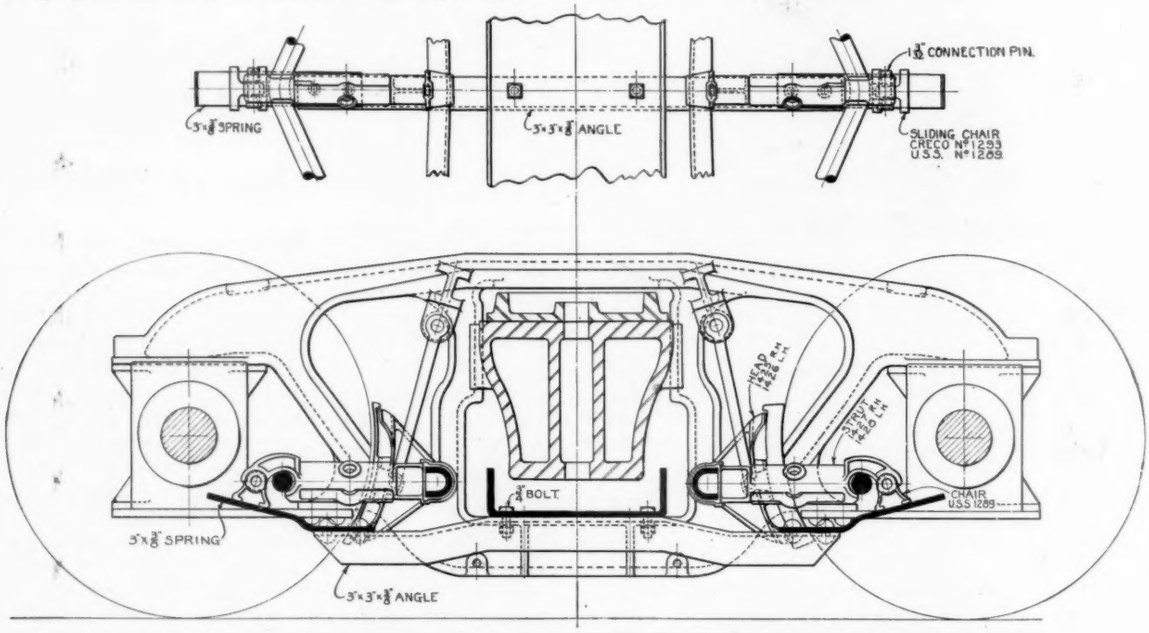
The operation of the cutter is simple and requires no special skill. Three men are necessary to operate the tool. The operator takes the left side handle with his left hand and rocks the valve handle with his right. Another man holds the right side handle, while the third man holds the chisel on the rivet. Turning the valve handle up opens the air port, which instantly permits the full force of the air to act on the plunger, driving it down the barrel and striking the chisel head. The valve handle is then thrown down to exhaust, and the plunger returns to the head of the tool ready for the next blow.

The force of the blow is entirely under control of the operator, and when the rivet is nearly off a light blow can be struck so that the rivets will not be thrown about with possible injury to persons nearby.

The valve head and nose piece are attached to the barrel by being forced on under 50,000-lb. pressure. With its 11-lb. chisel the Red Devil rivet cutter weighs 65 lb. It will give fairly good results with air pressure as low as 40 lb., and it will cut from 12 to 15 times as many rivets as can be cut in the same time by hand. The Duntley-Dayton Company, 1416 Michigan Avenue, Chicago, are sole distributors for the Rice Manufacturing Company, of Indianapolis, who manufacture the tool.

A Recent Development in Brake Beam Supports

THE CHICAGO RAILWAY EQUIPMENT COMPANY, CHICAGO, is exhibiting at the convention a recent modification of the Creco brake beam support, which was applied to all the tenders on the Railroad Administration standard locomotves. The flexible spring in this design is used only under the chair at the end of the strut. This flexible element furnishes an adjustable support and is riveted to the end of a 3-in. by 3-in. by ⅜-in. angle extending under the spring plank, which provides the maximum of safety in case the brake beam drops. This arrangement retains all the features of the former designs of the Creco third and fourth point supports, and is particularly applicable where a combination of long wheel base and heavy brake beam service is found.



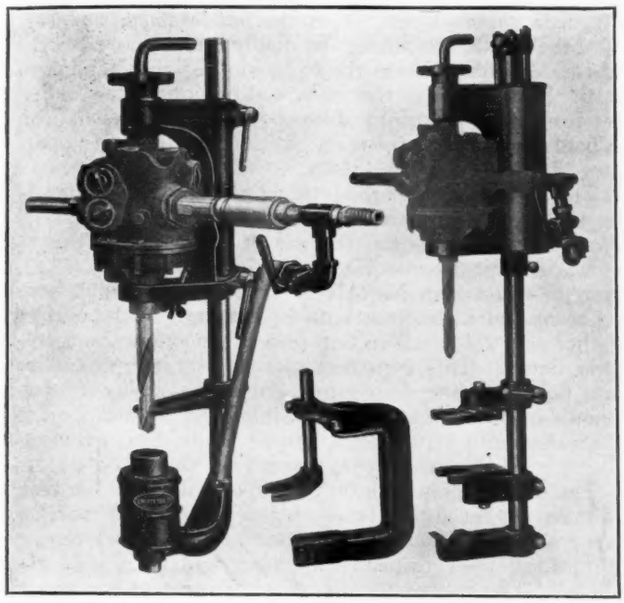
Latest Design of Creco Brake Beam Support

Labor Saving Shop Tools

THE LIBERTY TOOL COMPANY, Baltimore, Md., is showing a number of new devices designed to effect time and labor saving in shop work.

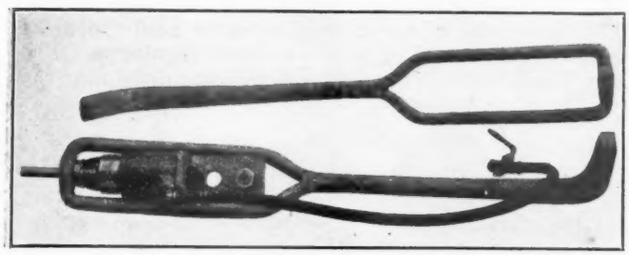
Portable Drill Presses

A portable drill press, designed to fit any make or shape of air drill having a vertical motor, is especially adapted for drilling and countersinking flange and plate



Portable Drill Presses with Crowfoot (center) for Double Cylinder Press (right)

work, such as firedoors, flue sheets and door sheets. This device has a 2¾-in. pneumatic feed end and is equipped with a sliding head taking any work from ½ in. to 14 in.



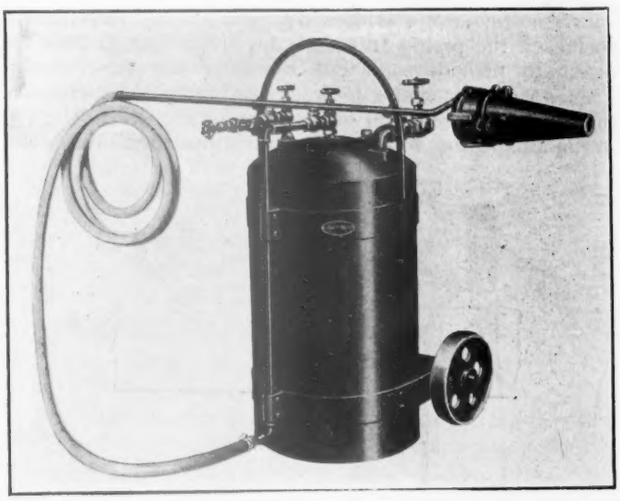
Holding-on or "Dolly" Bar

thick. It will drill holes from ½ to 1 5/16 in. and countersink up to 2 in. in diameter.

A double cylinder portable drill press with a crowfoot attachment is designed for any class of work and fits any of the pneumatic drills commonly used. It is equipped with a sliding head and a sliding table, has an 8 in. pneumatic feed and will drill holes up to 1 5/16 in. and countersink to 2 in. in diameter. It can be used as a radial drill press up to 18 in. in diameter of hole circle and the sliding head can be adjusted to take work up to 14 in. in thickness.

Rivet Heating Furnace

A portable rivet heating furnace using oil as fuel is designed so that the point of the rivet may be heated to any desired temperature, while the head is heated only to a cherry red or sufficient to readily conform to the work in the riveting operation. The top of this furnace is pierced with holes, through which the rivets are inserted, so that the point of the rivet is in the flame, while



Portable Heating Torch

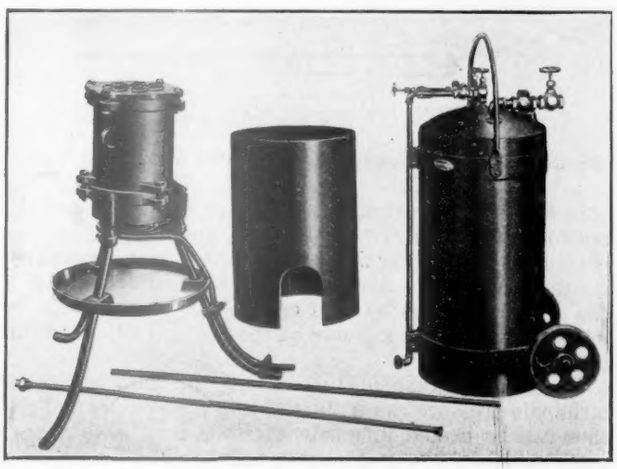
the rivet head rests on the outside or top of the furnace. The intensity and uniformity of heat may be regulated by means of a control valve.

Portable Heating Torch

This apparatus consists of a feul tank, a hose and a burner. The torch has one line of hose leading from the tank to the burner, which makes it convenient to handle in close places. This torch will heat to any desired temperature and may be used in the open air with excellent results.

Holding-On Bar

This holding-on or dolly bar has a pneumatic clamping device secured in a rectangular frame which is part of the bar itself. The bar can be placed in position quickly and the recessed end tightly clamped over the rivet. It may be readily applied in close quarters and is especially designed for use in locomotive flue sheet riveting and

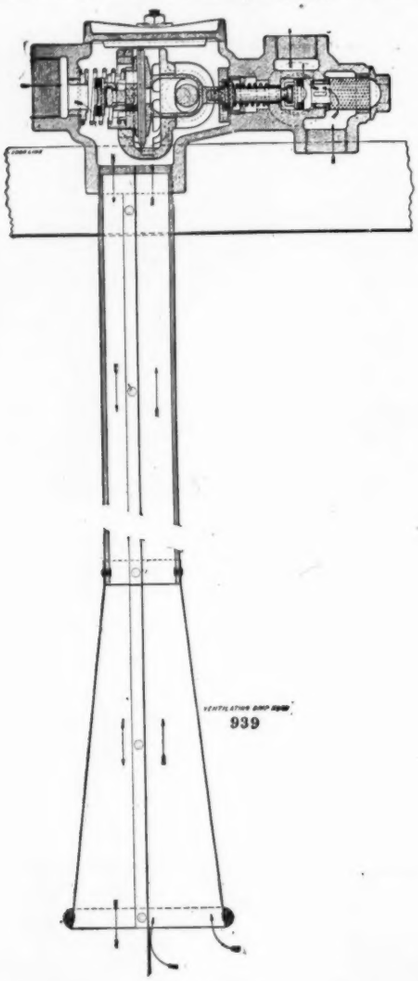


Rivet Heating Furnace

repair work. This company is showing a heading attachment for a riveting hammer, designed to rivet stay bolts and stay rods or countersink rivets and also a portable drill press for a close corner motor.

Combination Pressure and Vapor Valve

PREVIOUS TO THE INTRODUCTION of the vapor systems most of the car heating arrangements were of the direct or pressure type, the radiation of which was sufficient for severe winter weather. Many roads have increased the piping in older cars from time to time in order to provide sufficient radiation for vapor heat. This was an expensive proposition, but by the introduction of the combination pressure and vapor valve shown in the illustration, to cars already equipped with the pressure system, the advantages of the vapor system are obtained without additional radiation, and in addition the pressure system is available for the severest conditions. By the use of this valve, vapor can be used entirely on a car or pressure can be used entirely, or pressure can be used on the cold windy side of the car and vapor on the other.



Sectional View of Combination Pressure and Vapor Valve

It is stated that in the heating of cold trains in terminals pressure can be turned into the system, and the cars can be heated in much less time than with vapor, after which the vapor can be used. The installation of this valve on old equipment is said to be inexpensive and on new equipment the cost of its installation is claimed to be materially reduced because less radiation is required. This combination valve is said to weigh less than the ordinary vapor valve and the weight of the pipe and necessary fittings used in conjunction with it is claimed to be one-third to one-half less than that required by the ordinary vapor system. The complete valve is of packless design, non-adjustable and so constructed that by the operation of the lever handle, either pressure or vapor is obtained in the system.

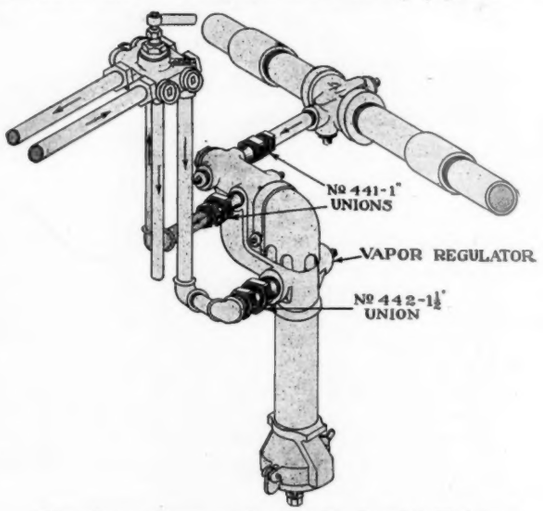
This system comprises a combination of vapor valve and steam trap arrangement for application inside of the car away from the danger of freezing. The diaphragm is located in the cradle, which is moved forward by a cam when the handle is set for vapor. In this position the ex pansion of the diaphragm is forward and the valve operates as a vapor valve. When the handle is set for pressure the cradle containing the diaphragm is moved backward. In this position the expansion of the diaphragm is to the rear, or in the reverse direction to that when set for vapor; therefore, the vapor operating mechanism is held stationary in the open position and the valve operates as a steam trap.

This valve, which is the product of the Gold Car Heating and Lighting Company, New York, is known as its No. 1170, and embraces the use of a diaphragm that is identical with the one used in its vapor valve No. 1112, and its steam trap No. 1165. It is constructed in two separate and distinct sections or diaphragms joined together as a unit, each section separately containing a volatile liquid. This construction increases the flexibility and power of the diaphragm and also doubles its life. Should one section fail, the remaining section will operate the valve until replacement can be made, thus avoiding shutting off the steam from that side of the car.

The disk holders both on the vapor valve and the trap end are of the quick removable type, the rear portion being slotted. In case of necessary removal they can be slipped off their respective spindles and be readily replaced. The two plugs, one on either side of the vapor chamber, give access to one disk holder and the cover of the diaphragm chamber gives access to the other.

Special Metal Union Connection

THE VAPOR CAR HEATING COMPANY, INC., of Chicago, is showing a Vapor regulator with a special metal joint type of union used in order easily to make repairs and renewal of parts of Vapor regulators. The 1-in. size is used in the feed and delivery pipes near the top of the regulator, and is so made that there is ample clearance for the union nuts when both are used on the



Regulator Connected with the Special Unions

same side of the regulator. The 1½-in. size is used for the bottom or return connections. The male end of the union (made of wrought iron) screws in the regulator casting, and the female end (made of brass) is used on the end of the pipe.

When a regulator is removed the male end of the union remains in the regulator and the female end of the union remains on the pipes, so that a duplicate regulator equipped with the male end of the union can be applied in place of a defective regulator very quickly and conveniently. This avoids the inconvenient and slow method of making repairs or renewal of parts to a Vapor regulator when it is attached to the pipes underneath the car.

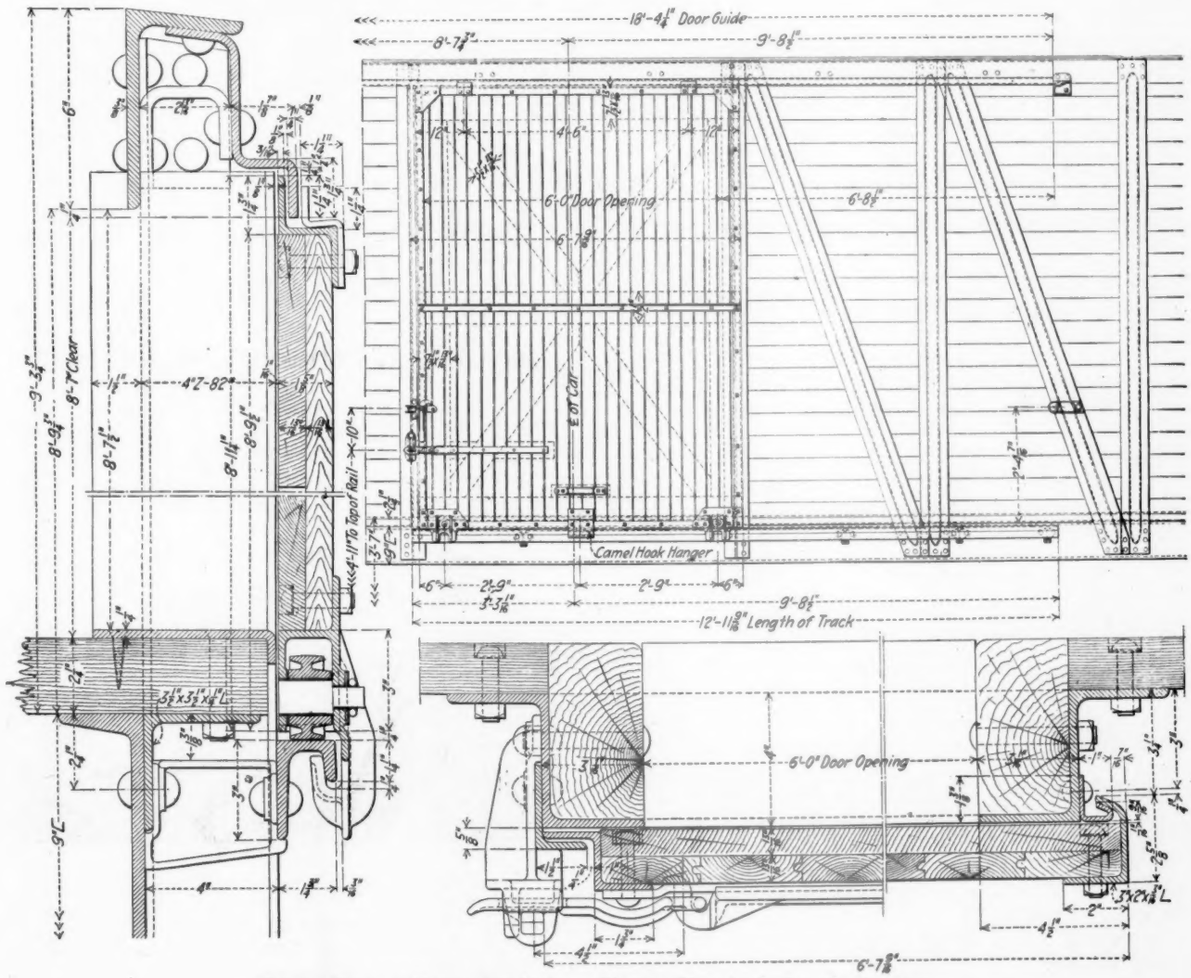
Bottom Supported Car Door

A BOX CAR DOOR OF NEW DESIGN which has been applied to cars built for the Railroad Administration is being exhibited by the Camel Company, Chicago. This door, which is known as the No. 50, is applicable to either single or double sheathed cars. The ilustration shows the arrangement of the door as applied to the single sheathed standard cars. It has a steel frame made of bottom and run on a continuous track of specially designed section. The hangers are of the double supported type, permitting of replacement of the wearing parts. A hook hanger between the rollers keeps the bottom end of the door from moving outward.

The door is made spark and weather-tight at the front door post by extending the flange of the Z-bar on the frame between the Z-bar and angle on the post, and at the rear post by a post strip which overlaps the angle on the frame when the door is closed. A burglar proof locking arrangement is used and a door starter of the eccentric type is located above the hasp. The design of the No. 50 door as applied to double sheathed cars is generally similar to the one illustrated, but there are numerous changes in the details.

Spring Journal Box Packing

THE UNIVERSAL PACKING & SERVICE COMPANY, CHICAGO, is exhibiting in the booth of the Anchor Packing Company a journal box which has been in service for ten months under a locomotive tender, without any new material being added or the waste in



Camel No. 50. Door Applied to Single Sheathed Standard Cars

angles and two bars braced by gusset sheets at the four corners. The door guide, which is of ¼-in. pressed steel reinforced the side plate and fits between the Z-bars at the top of the frame. The rollers are mounted at the

the box picked up. The packing used in this box is of a new type known as Spring Journal Box Packing. It is composed of thread stock cotton waste, with mechanically inserted coiled wire springs, to give it resilience.

Plain cotton waste is a good conveyor of oil, because of its high capillary properties, but lacks resilience. Wool waste has more resilience than cotton waste, but lacks the capillary properties of the cotton. In Spring Journal Box Packing cotton waste, with its high capillary qualities, is given a resilience much greater than that of plain wool by means of the inserted springs. The packing is made with either brass or steel springs, as may be specified. The springs are made of No. 18 gage wire, with a lineal pitch of 5/8 in., 2 in. long and 1 in. in diameter.

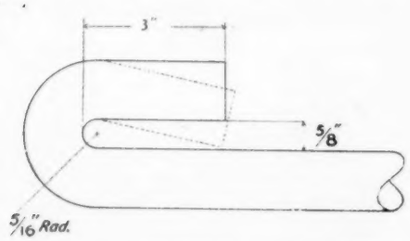
During the past twelve months a series of tests has been conducted which, it is claimed, has demonstrated that spring packing will produce entirely successful lubrication, requiring 20 per cent less weight of dry packing in the initial packing of the boxes, as compared with the amount necessary if packing without springs is used. This packing does not have to be picked up in the jonrnal box with a packing iron at frequent intervals, nor is it necessary to add to the original amount of waste. Due to its looseness, or openness of structure, spring packing does not glaze over the surface which is in contact with the journal.

The springs are of an open pitch, so that when laid on the side they will have a spring action as well as when on end. The boxes should be packed in the same manner as with ordinary waste, except that it is unnecessary to pack them as tight, due to the fact that the springs will keep this packing against the journal, whereas in the case of plain waste there must be tight packing in order to get this result. Spring packing can be reclaimed by the same methods used with the ordinary packing when it has become dirty.

Detachable Drop Forged Brake Rod Jaw

THE SCHAEFER EQUIPMENT COMPANY, Pittsburgh, Pa., which manufactures the Schaefer truck lever connection, has developed and is showing at its booth, a drop-forged detachable type of brake rod jaw of improved design and increased strength as compared to the common welded-on type of jaw.

This jaw is made from open hearth low carbon bar steel, and is so constructed that it is very easily attached



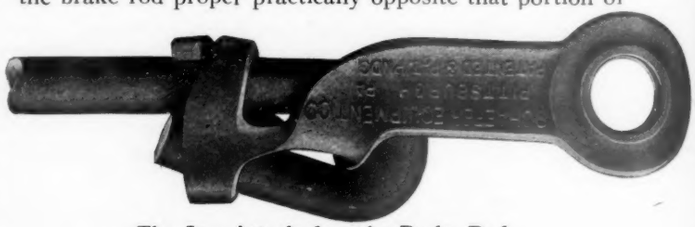
Proportions of the Bend in the Brake Rod

and is securely held to the rod by means of double locking prongs. In the event of a change in the length of brake rods, these prongs may easily be folded back and reattached without danger of damage to the brake jaw. It is of the same relatively light construction that characterizes the Schaefer design of brake lever connectors and is so proportioned that it will develop the full strength of any given size rod. At the booth may be seen several samples applicable to freight car equipment, which have been pulled to various loads, one of these having been subjected to a tension load of 32,200 lb., at which load the 7/8-in. diameter steel rod broke, the fracture occurring at a considerable distance from the point of attachment.

The advantages of the mechanical structure, as embodied in the design displayed, over other types of jaws

The Jaw with Locking Prongs Open

are that the bent over portion of the rod engages a solid portion of the jaw structure; the rod entering the jaw in a straight line with the hole, the locking prongs engaging the brake rod proper practically opposite that portion of



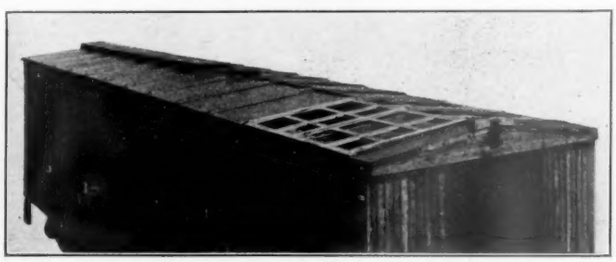
The Jaw Attached to the Brake Rod

the rod which locks the front end; and the jaws has been designed so that it can be produced in a drop forging operation with corresponding increase in strength and decrease in weight.

A Flexible Car Roof for Repairs

A NEW DEVELOPMENT in the repairing of car roofs is the application of a new all-steel flexible roof to the old carlines. This method has been developed by the Hutchins Car Roofing Company, Detroit, Mich.

In the past it has been necessary to use a special steel carline when applying a new steel flexible roof and the old carlines were usually scrapped; this waste of material is now eliminated and the labor cost of applying a new roof is reduced to a minimum. When applying a flexible roof in this manner the old roofing boards are removed, leaving the old carlines of wood or steel in place and the new all-steel flexible roof is applied direct to the old



The Flexible Roof Applied to the Old Carlines

carlines. These steel flexible roofs are made of 16, 18 or 20 gage sheet steel. This thickness is about three times that of the ordinary outside or inside metal roof, and because of the thickness of the weatherproofing steel sheets, together with the fact that no roofing boards are required, this method of repairing car roofs offers great possibilities in facility in repairing and economy in cost of material and labor.